

1 UNITED STATES DISTRICT COURT
2 FOR THE WESTERN DISTRICT OF NORTH CAROLINA
3 ASHEVILLE DIVISION

4 STATE OF NORTH CAROLINA)
5 ex rel. Roy Cooper, Attorney)
6 General,)
7 Plaintiff,) No. 1:06-CV-20
8 vs.) VOLUME 6A
9)
10 TENNESSEE VALLEY AUTHORITY,) (Page 1285-1426)
11 Defendant.)
12)

13 TRANSCRIPT OF TRIAL PROCEEDINGS
14 BEFORE THE HONORABLE LACY H. THORNBURG
15 UNITED STATES DISTRICT COURT JUDGE
16 JULY 21, 2008

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P R O C E E D I N G S

THE COURT: Is the State ready to proceed,
Mr. Gulick?

MR. GULICK: Yes, Your Honor.

THE COURT: And the TVA?

MS. GILLEN: We are, Your Honor.

MR. GULICK: Good morning, Your Honor. Jim Gulick
for the State.

Our next witness is Todd Morse.

THE COURT: All right, sir.

TODD MORSE,

being duly sworn, was examined and testified as follows:

D I R E C T E X A M I N A T I O N

MR. GULICK: Your Honor, may I approach the witness
to just show him how to use the screen?

THE COURT: Yes, that would be fine.

BY MR. GULICK:

Q. Please state your full name.

A. It's Todd Baker Morse.

Q. Where do you live, Mr. Morse?

A. I live in south Buncombe County.

Q. And how long have you lived there?

A. In my current residence, about ten years.

Q. How long have you lived in Buncombe County?

A. I've lived in Buncombe County for ten years. I've lived

1 in western North Carolina about 21, 22 years.

2 Q. And what is your current occupation?

3 A. Current occupation is president of Chimney Rock Company.

4 Q. Until the last few years, had you been the president and
5 general manager of the Chimney Rock Park?

6 A. Yes, that's correct.

7 My family owned Chimney Rock Park for 105 years, from
8 1902 to 2007. We sold it to the State of North Carolina
9 in -- and we finalized the sale in May of 2007.

10 Q. And if you could, could you just give us a little bit of
11 the history of the park? Was it operated as a park for that
12 period of time?

13 A. Well, the brief history is that my great-great uncle,
14 Dr. Lucius G. Morse, was a physician who was practicing
15 medicine in Chicago. He contracted tuberculosis and ended up
16 moving to North Carolina for the air quality, basically.

17 At that time, around just after the turn of the 20th
18 Century, there were a lot of clinics, sanitarium, set up for
19 tuberculosis sufferers in this area, and he came here
20 specifically for that purpose, to recuperate. And he used to
21 ride down through the Chimney Rock area for recreation, and
22 paid the family that owned it, back in 1902, 25 cents to ride
23 out to Chimney Rock. He fell in love with it, bought the
24 original 64 acres back in 1902, and then, over time, added
25 about a thousand acres.

1 It had been open to the public prior to our operating
2 it, and we operated it, as I said, for about 105 years as a
3 scenic attraction, a natural scenic attraction.

4 **Q.** And did you -- how much of that did you sell to the
5 state in 2007?

6 **A.** We sold the entire thousand acres to the state. We
7 basically sold all of the assets and the business to the
8 State of North Carolina for inclusion of what is now Chimney
9 Rock State Park.

10 **Q.** During the time in the last few years that you were the
11 operator of Chimney Rock State Park, approximately how many
12 visitors came to the park each year?

13 **A.** The average was in the neighborhood of a quarter
14 million, 250,000.

15 **Q.** Did Chimney Rock visitors come from all over the
16 country, or were they local, or both?

17 **A.** It was both. Lot of North and South Carolina residents
18 came. But we had a lot of international visitation, as well
19 as visitation from across the country as well.

20 **Q.** What kinds of activities can visitors do when they're at
21 Chimney Rock State Park? Or Chimney Rock Park.

22 **A.** Well, the portion that is open to the public is still
23 what was known as Chimney Rock Park, and, basically, there's
24 a 315-foot rock monolith called Chimney Rock, and so visitors
25 can take in the wonderful scenic views from the top of that;

1 and we've got interesting rock formations, a number of hiking
2 trails, and a 404-foot waterfall that was featured in the
3 "Last of the Mohicans."

4 Q. And about approximately how many -- what length of
5 trails or how many miles of trails are there?

6 A. We've got, I think it's just over five miles of trails.

7 Q. Like to bring up Exhibit 265. And go to page 3, if you
8 would.

9 Ask you first, Mr. Morse, if you can identify what this
10 document is.

11 A. This is the trail map that is used down at Chimney Rock
12 Park to help people orient themselves when they come for a
13 visit. This is generally the piece of literature they're
14 handed at the gate. You can also pick it up in other places.
15 But, primarily, we use it as a handout at the gate to show
16 people all around the park.

17 MR. GULICK: If we could go to page 3 of this
18 document and just sort of focus in a little bit on the map
19 itself, Gary, on the screen. Just if you could enlarge that.

20 Your Honor, I believe it may be easier to see it on
21 the screen than on the hard exhibit.

22 BY MR. GULICK:

23 Q. I was wondering if you could, Mr. Morse, just sort of
24 point out the various features here on this map.

25 This is the map you were talking about?

1 A. Yes, that's correct.

2 I'll circle the main feature. Let's see if I can do
3 this. Okay. That is Chimney Rock, and, as I mentioned,
4 that's really the namesake for the park. That's the primary
5 rock formation that we have, where 100 percent of our
6 visitors will come and visit.

7 As you'll see, the items marked in what looks like black
8 on this screen, up here and here, are two of our trails that
9 go to the top of the falls, and then, down below, is the
10 trail that goes to the bottom of our falls, which is, of
11 course, over here on the right-hand side of the screen.

12 And basically, when you're hiking the trail,
13 particularly on the upper trails, it's full of incredible
14 scenic views up and down the valley, looking back up toward
15 Little Pisgah, going toward Asheville and all the way down
16 towards Lake Lure and out on the Piedmont plateau below us.

17 Q. And what place on this map was shown in the movie "Last
18 of the Mohicans" that you mentioned?

19 A. Let me see if I can figure out how to clear this. There
20 we go. I got it.

21 Q. Got it?

22 A. I think. Oops. I've got to go back. Is there a clear
23 all?

24 Q. It's on the bottom right.

25 A. Okay. During the "Last of the Mohicans," there was

1 footage that was shot at Groundhog Slide, which was one of
2 the last fight scenes, second to the last fight scene, along
3 the cliff trail; and then the final scene was shot at the top
4 of the 404-foot waterfall. There was a view just before they
5 actually entered Chimney Rock that was taken across the
6 valley showing the mountain and primarily showing the
7 waterfall in the background.

8 **Q.** I'd like to show you what's been marked as Exhibit 264.
9 And it will show up on the screen.

10 **MR. GULICK:** Your Honor, we've provided you a --
11 Your Honor, we've provided you a courtesy copy of the actual
12 document, I believe your clerk is handing you.

13 **THE COURT:** Yes, sir.

14 **BY MR. GULICK:**

15 **Q.** Mr. Morse, what is this document?

16 **A.** This had been a book that we had produced in conjunction
17 with a local photographer, Scott Graham, to depict a lot of
18 the scenes in the park. And it was really a souvenir book
19 that was produced a number of years ago.

20 **Q.** And on the cover of this document, what are we looking
21 at?

22 **A.** You're basically looking at a view from the stair tower
23 just to the west of Chimney Rock that goes from around the
24 opera box area to the Devil's Head area on the trails, and
25 looking across Chimney Rock, which is the obvious rock

1 formation in the lower part of the picture, and then across
2 that to the Piedmont plateau, including Lake Lure just off in
3 the distance.

4 Q. And I'd like to go into this document to page 6.

5 MR. GULICK: Your Honor, if you look at the
6 courtesy copy, the pages are tabbed with little markers, the
7 ones that we're going to go to.

8 BY MR. GULICK:

9 Q. And Mr. Morse, what are we looking now at on the screen?

10 A. What looks like, on a very clear day, you're getting a
11 picture of Chimney Rock taken from the parking lot area just
12 below Chimney Rock, which is what most visitors would come up
13 to and park at during a visit to the park.

14 Q. Now let's go to page 12 of the electronic copy. And
15 what are we looking at in this picture?

16 A. That is our 404-foot Hickory Nut Falls.

17 Q. Is that the highest fall in the park?

18 A. Yes, it is. It's one of the highest falls in the
19 eastern United States, actually.

20 Q. Now I'd like to direct your attention to page 12.

21 Oh, excuse me, page 18.

22 What are we looking at in this picture on the screen?

23 A. That's a picture of one of the rock formations that
24 we've got in the park called the Devil's Head, and it sort of
25 resembles a devil's head by profile. It was formed over many

1 years of erosion and weathering and so forth, and it's a rock
2 that sits out on the edge of one of our cliff faces.

3 Q. And what is the valley or gorge that we're looking up?

4 A. You're basically looking up what we refer to as Hickory
5 Nut Gorge. And Hickory Nut Gorge is the area that's made up
6 of the towns from Gerton through Bat Cave, Chimney Rock, and
7 all the way to Lake Lure. It's a natural gorge that was
8 carved by what we call the Rocky Broad River over many, many
9 years. It's a very steep gorge with rock-faced walls on
10 either side of it.

11 Q. And is there a mountain in the distance partly obscured
12 by the Devil's Head itself?

13 A. Yeah. That would be -- the one immediately behind the
14 Devil's Head would be Little Pisgah, which would be the
15 mountain I referred to earlier that is -- I believe if you
16 stand on top of Little Pisgah, that would offer you a view
17 looking back toward Asheville. So it's the highest peak in
18 that immediate area.

19 MR. GULICK: Your Honor, I'd like to ask that this
20 Exhibit 264 and the one preceding be admitted into evidence
21 for illustrative purposes.

22 MS. GILLEN: No objection, Your Honor.

23 MR. GULICK: And the other was 265.

24 THE COURT: Let it be admitted. That would be 264
25 and 265.

1 (Plaintiff's Exhibits 264 and 265 received.)

2 BY MR. GULICK:

3 Q. I'd like now to look at Exhibit 270. And Mr. Morse,
4 what are -- what is this?

5 A. That's a view of what we call the Rock Pile, another
6 rock formation in the park. And this was taken not too long
7 before sunset. I think this photo gives you an idea of some
8 of the sweeping vistas and panoramas that we have in the
9 park. This would be looking, I guess, northwest, and it was
10 taken from an observation -- another observation point, rock
11 formation, called Pulpit Rock, looking back north to
12 northwest, back up the valley.

13 Q. Now I'd like to show you what's been marked for
14 identification as Plaintiff's Exhibit 271 and ask you if you
15 can identify this.

16 A. That, of course, is Chimney Rock, the top of Chimney
17 Rock.

18 Q. And is this the same photograph that was actually used
19 on the cover of the brochure?

20 A. It was on -- I believe on the cover of our brochure, not
21 on the book that we saw earlier, because that was taken
22 during fall color.

23 Q. So this is another time of year?

24 A. Yeah. This is during probably the spring or summer.

25 Q. And there appears to be a tree on the top of this. Is

1 that right?

2 **A.** That's correct. It's a pine that has been there for
3 many, many years, and it's very interesting that it just
4 grows out of the rock. One of the other things that is
5 interesting about that tree is that we refer to it as a flag
6 tree because -- and I was going to point out on the slide of
7 the Rock Pile the same thing, because I happened to notice
8 another flag tree on that drawing -- or on that photograph as
9 well.

10 And the reason why it's referred to as a flag tree is it
11 shapes itself over time in the direction of the prevailing
12 winds. And it's kind of hard to tell from this photograph,
13 unfortunately, but if you were on top of Chimney Rock, it's
14 very obvious and apparent which direction the tree is shaped,
15 and it basically is leaning from the west to the east. It is
16 pointing toward the east. Our prevailing wind direction
17 comes up the valley from the west to the east.

18 **MR. GULICK:** Your Honor, I move that Exhibits 270
19 and 271 be admitted into evidence for illustrative purposes.

20 **MS. GILLEN:** No objection, Your Honor.

21 **THE COURT:** All right. Let those be admitted.

22 **(Plaintiff's Exhibits 270 and 271 received.)**

23 **BY MR. GULICK:**

24 **Q.** I'd like now to -- Mr. Morse, did Chimney Rock Park
25 produce a video of a 360-degree view from Pulpit Rock?

1 **A.** Yes, we did. We have a number of pictures that are
2 viewed through an IPIX viewer. One is of at the top of
3 Chimney Rock that we've used on our website to give people a
4 better idea of what their experience would be like. I can't
5 recall, but I think it's in the virtual tour part of our
6 website.

7 Again, there are a number of places in the park where it
8 gives people -- and on our website -- where it gives people
9 the opportunity to get more of a sense. It's kind of hard
10 sometimes to capture the awesomeness of the scenic beauty
11 that we've got down there, and I think this IPIX give you a
12 much better perspective of what's around on top of Chimney
13 Rock and a couple other places in the park.

14 **MR. GULICK:** Your Honor, with the Court's
15 permission, we would like to show the two very brief
16 360-degree views. We have the videos. With the Court's
17 permission.

18 **THE COURT:** All right.

19 **BY MR. GULICK:**

20 **Q.** Now, I'd like to look first at the -- this is -- if you
21 can identify what this one is. And we'll rotate it and stop
22 at various places. If you can identify what we're seeing,
23 Mr. Morse.

24 **A.** Okay. This would have been where we would have set the
25 IPIX tripod on Pulpit Rock, which is a rock formation. You

1 see Chimney Rock up here. Right over here. And where you
2 would -- where this person would have been standing, you get
3 the same image you do on that rock formation I refer to as
4 Pulpit Rock.

5 **MR. GULICK:** Now could you rotate it, Gary, to the
6 left?

7 **THE WITNESS:** Now you're starting to see the view
8 across Lake Lure, down right below where the icon is. And
9 out -- and that's a view looking directly east. And, again,
10 there is Lake Lure right there.

11 And then you're starting to look at the beautiful
12 rocks, rock cliffs that we've got across from us, one being
13 that mountain just below where I just touched, Rumbling Bald,
14 and another one being just there under the icon called Round
15 Top. But you get a sense of the incredible views that we've
16 got all around this area.

17 That's looking -- starting to look pretty much
18 directly north at this point. And then you'll see looking
19 back up the valley. At this particular viewpoint, you won't
20 be able to see all the way back up the valley. If you were
21 able to get past this pine tree over here, or whatever that
22 is, you would be looking back up, directly up the valley to
23 the west.

24 And, of course, over here on the left-hand side of
25 the image is the rock cliffs within Chimney Rock. On the top

1 of that is our upper trail, the Skyline trail, and just at
2 the base of that would be the trail, which would be one way
3 you would access the rock formation you see down below you.

4 But this looks like it was taken on a relatively
5 clear day.

6 **MR. GULICK:** Thank you.

7 Gary, could we go to Exhibit 273?

8 Your Honor, what we just looked at is Exhibit 272,
9 and we're about to look at -- this is -- this, Your Honor, is
10 marked for identification as 273.

11 **BY MR. GULICK:**

12 **Q.** Mr. Morse, what is this?

13 **A.** This is a view from the top of Chimney Rock. And,
14 again, the tripod was set on top of the chimney itself, and
15 this is the view that we believe 100 percent of our visitors
16 will experience while they're there, unless they have severe
17 fear of heights, because you do have to climb up about 44
18 steps to get to this area. So let's say 99.9 percent of our
19 visitors go to that.

20 Again, you're looking at -- this is as a little aside --
21 a plaque that commemorates our family's history with the
22 park. You'll see again Lake Lure out there in the distance.
23 So off to this area, you're looking directly east. The IPIX
24 does distort things a little bit because it's a bit of a
25 fisheye lens, so it looks a little bit more tilted than it

1 actually is. But, again, you're looking at, where the arrow
2 is, out in the direction of Lake Lure, which is east,
3 directly east.

4 Q. Do you know how far you can see in that direction when
5 it's clear, as it appears to be in this picture?

6 A. On a very clear day, you can see to King's Mountain and
7 just a little bit beyond that. And that's why, over many
8 years, we used to -- in my early years of involvement with
9 the park, when I started in 1986, we featured the 75-mile
10 view prominently as part of our brochure because on many
11 clear days you could see 75 miles, on the clearest days.

12 Q. Does that remain the case?

13 A. We have, over the last number of years -- of course, I
14 can't remember exactly when it was withdrawn -- but we have
15 deemphasized the views from the top of Chimney Rock, and we
16 do talk about the views in our website, but they are much
17 less prominent than they used to be.

18 Frankly, there were a number of factors in deemphasizing
19 those views, but one of the primary ones for me was that we
20 were having many more days, in my experience of my 21 and a
21 half years directly involved with the park, that visibility
22 was greatly limited, and, in fact, on some of the worst days
23 of summer haze, about where I have the arrow, at the end of
24 Lake Lure would have been about as far as you could see,
25 which I've not measured it exactly, but my estimate would be

1 in the neighborhood of 5 to 7 miles from the top of Chimney
2 Rock to that point.

3 And so we did deemphasize the 75-mile views because we
4 didn't want our visitors to come and be disappointed if they
5 couldn't experience the 75-mile views.

6 Q. In your experience, are they disappointed if it's hazy?

7 A. Well, I think so. My experience has been that. We had
8 done a number of marketing research pieces over the years to
9 try to get a sense of why our visitors are coming to the
10 park, and every time we have done those marketing research
11 pieces, the number one reason that they say they're coming is
12 the views and mountain scenery. And I also believe that the
13 City of Asheville, Buncombe County tourism folks that have
14 done research in this area, it's the same reason that people
15 are coming to western North Carolina, for the scenic views.

16 Q. As a businessman, did you use and rely on market tourism
17 at that time?

18 A. Oh, absolutely. We are a very marketing research driven
19 organization. We definitely listen to our visitors and try
20 to understand what they want and try to give them what they
21 want. We, over the years, have done quite a number of
22 marketing research pieces.

23 Q. In this particular case --

24 MR. GULICK: Gary, can you rotate -- this is one of
25 those 360-degree views. Rotate to the right.

1 **THE WITNESS:** There's a better picture of our flag
2 tree, and I think you can see -- I don't know how to draw it
3 on here, but you can see about where the arrow is that that
4 was the tree that I was referring to, the pine, and you see
5 how it leans. And, again, with a bit of distortion of the
6 fisheye lens in the way that it moves across, it's hard to
7 tell exactly what direction, but you can see that it is
8 leaning, and I think if you were on top of Chimney Rock, it's
9 very clear to see that it is leaning toward the east.

10 **MR. GULICK:** Can we now rotate a little bit further
11 to the right, Gary?

12 **THE WITNESS:** This is looking back toward our
13 Skyline gift shop and elevator. It's a little bit hidden
14 right behind the tree. Of course, this is the rest of
15 Chimney Rock Mountain, looking back and away from Lake Lure,
16 down toward where the stairs are leading off Chimney Rock.
17 And then there's the view looking back up the valley.

18 **MR. GULICK:** Thank you.

19 Your Honor, like to move the introduction, the
20 admission of the two film clips, Exhibits 272 and 273, for
21 illustrative purposes.

22 **MS. GILLEN:** No objection, Your Honor.

23 **THE COURT:** All right. Let those be admitted.

24 **(Plaintiff's Exhibits 272 and 273 received.)**
25

1 BY MR. GULICK:

2 Q. Now, I think you've already indicated these were filmed
3 on relatively clear days.

4 A. That's correct.

5 Q. Mr. Morse, to what degree has -- are most of the days,
6 in your experience, as clear as the ones that are shown in
7 this film clip -- in these film clips?

8 A. In my experience, the days, primarily in the summer,
9 once we get into June, July, August, are not nearly this
10 clear. In fact, you know, I know a number of times where
11 I've gone up to the chimney and barely been able to see to
12 the end of Lake Lure, as I indicated a few minutes ago.

13 Q. Based upon your 20 years of experience, or 21 years of
14 experience, do you believe that it affects the quality of the
15 experience that your visitors have?

16 A. I believe it does, because I think that we have -- as a
17 business, we have a lot of what may be available for free in
18 western North Carolina, but one of the things that's really
19 our business premise was that in Chimney Rock Park you could
20 see all that's special about western North Carolina in one
21 place, and if you take away one of those things that's
22 special about western North Carolina, I would believe that
23 our visitors would not have as good of an experience. You're
24 taking away one of the main selling points that we've got for
25 people to be there.

1 Q. Now, do you have an understanding about, in just a
2 general manner, about what's causing that haze? Not who, but
3 what.

4 A. Well, I would say yes, from the standpoint that I read
5 the newspaper. I try to keep myself informed. I'm involved
6 with --

7 MS. GILLEN: Your Honor, we object to this
8 testimony. Mr. Morse is a fact witness.

9 THE COURT: Sustained.

10 BY MR. GULICK:

11 Q. Mr. Morse, is the haze that you see the same as clouds?

12 A. No, it's not; it's very different. Clouds are -- you
13 know, come in different forms and sizes and shapes and so
14 forth, but I think the haze that we see is more just evenly
15 spread and it's not distinctive, as clouds are.

16 Q. Is air pollution a concern -- was air pollution of
17 concern to you as an owner of Chimney Rock Park?

18 A. Yes, it was, I think for several reasons. One was, as
19 I've already mentioned about the view, the impact on the view
20 with haze, being our number one reason why people are coming
21 to the park and that impacting that.

22 I think, and I'm reminded this morning that there was a
23 mention of ozone, high ozone levels, a code orange, I
24 believe, this morning when I opened up the paper. And we're
25 about hiking and getting outdoors, and our trails, one thing

1 I should have mentioned is we rate them as moderate to
2 strenuous. And so the article that I read this morning
3 specifically talked about limiting outdoor activity in the
4 afternoon, and, you know, when you hear "code orange," you're
5 not thinking about going hiking.

6 And I think the other issue is the publicity. We are
7 very much, as I mentioned, marketing research driven. We're
8 also very much word-of-mouth driven. That still shows up as
9 our number one form of advertising, and experiences that
10 people have at Chimney Rock help drive whether other people
11 come as well. And I think when you see code orange days
12 showing up or when you see record ozone days in the Smokies
13 in the newspaper, that's not really the kind of publicity
14 that is beneficial to the tourism industry and helping people
15 want to make a choice to come to visit Asheville.

16 A lot of those things we do -- we put a lot of money
17 into marketing to try to get people to come visit Chimney
18 Rock, and that kind of negative publicity about the air
19 quality in this area definitely can't be helping our business
20 here at Chimney Rock or anywhere in western North Carolina.

21 Q. As a business person, or even in your personal capacity,
22 have you taken any actions to deal with the fact of air
23 pollution?

24 A. Yes, I have. I got involved with a group called the
25 Clean Air Community Trust in Buncombe County when it was

1 first formed. It was a group of Buncombe County and
2 Asheville City folks that had gotten together that formed
3 this organization. It's all about educating the public,
4 coming up with programs around air quality, around energy
5 conservation. We do a lot of, I think, interesting and
6 innovative things to try to help our young people in this
7 area learn more about air quality issues in this area as
8 well.

9 I also -- and I can't recall the date, but I was
10 involved with the grassroots group that was put together that
11 helped create the Clean Smokestacks legislation a number of
12 years ago. I was asked to serve on a committee of business
13 people and environmentalists and other folks that were very
14 concerned about the air quality, and, again, were the ones
15 who ultimately drafted the Clean Smokestacks legislation. As
16 part of that, I was asked to go to Raleigh to speak on the
17 legislature steps as a representative of the tourism industry
18 to help introduce the bill.

19 Q. Did you do that?

20 A. I did, along with a medical professional and some of the
21 legislators that were sponsoring the bill. And I got
22 involved with it because I knew it was an important first
23 step for the State of North Carolina to clean up its air, and
24 I spent some time lobbying some of our legislators to try to
25 get the bill passed, and was very delighted that it did,

1 through a lot of people's hard work.

2 **Q.** Does air pollution have a more personal impact on you
3 and your family?

4 **A.** Yes, it does. I'm a runner. I'm training for the New
5 York City marathon this year, which is a little scary. It's
6 only my second. But I like to run, and, obviously, to a
7 long-distance runner, air quality is pretty important
8 personally.

9 And my wife has, unfortunately, in the last, I think it
10 was six to eight years, developed asthma from living in this
11 area -- as she's lived in this area.

12 And I've got two children, and I'd like for them to grow
13 up in an area where the air is clean to breathe. And again,
14 that was the reason why my family came here in the first
15 place, my great-great uncle recuperating from tuberculosis.
16 This was an area known for its air quality a long time ago.

17 **MR. GULICK:** I have no further questions.

18 **MS. GILLEN:** Just a few, Your Honor.

19 **CROSS EXAMINATION**

20 **BY MS. GILLEN:**

21 **Q.** Good morning, Mr. Morse.

22 **A.** Morning.

23 **Q.** I don't know if you need it, but if you do, we're kind
24 of doing the low-tech version of the exhibits, so it's
25 Plaintiff's Exhibit book 5 that will have exhibits, if you

1 need them.

2 A. Okay.

3 Q. I know you said you deemphasized the 75-mile views from
4 Chimney Rock. But they're still contained on your website,
5 right?

6 A. They are. That's correct.

7 Q. And the 75-mile views was also featured in the press
8 release about the sale of the park to the State of North
9 Carolina?

10 A. I'd have to see that. I'm not aware of that. But I
11 know there -- that was a very crazy time, when we were
12 selling, so I can't recall. I'd have to see that.

13 Q. Well, if you want to take a look, it is in that book No.
14 5, North Carolina exhibit book.

15 MR. GULICK: Your Honor, may I assist him in
16 finding that?

17 THE COURT: All right.

18 THE WITNESS: Could I ask for clarification? What
19 was the origin of that press release?

20 MS. GILLEN: It was a June 28, 2007, press release.

21 THE WITNESS: Was it -- I guess my question was,
22 was it issued by the State of North Carolina or by Chimney
23 Rock management?

24 MS. GILLEN: It's in the media room of the Chimney
25 Rock Park website, I believe. We'll look at it in a minute.

1 MR. GULICK: 274?

2 MS. GILLEN: Exhibit 274.

3 BY MS. GILLEN:

4 Q. And if you look on page -- page 1 shows you where it's
5 from, and then page 2, under the heading "Chimney Rock
6 Park" -- let's see.

7 A. Oh, I see. I see where it is, on page 2. This would
8 have been -- yes, I acknowledge that that is in there.

9 Again, my comments were really that, from a brochure
10 standpoint, it was featured on the front of the brochure,
11 which means it was featured very prominently as a reason why
12 people would want to come there. It is still -- on a clear
13 day, we do have 75-mile views. That is still correct.

14 Q. And do you offer free admission to children under six?

15 A. Yes.

16 Q. I have a vested interest in this. I have a
17 five-year-old, so just checking.

18 And you have reduced admission to children between the
19 ages of six and 15?

20 A. Yes, that's correct.

21 Q. And I think you just testified earlier that you welcome
22 about a quarter of a million visitors each year to the park?

23 A. Yes. In and around that area, yes.

24 Q. Great. Hopefully, it'll be a quarter of a million and
25 one soon.

1 Thank you very much.

2 A. Thank you.

3 MS. GILLEN: No further questions, Your Honor.

4 MR. GULICK: No redirect, Your Honor.

5 THE COURT: All right. Did you say --

6 MR. GULICK: I have no further questions.

7 THE COURT: All right, then, Mr. Morse, that will
8 complete your testimony and you are excused.

9 THE WITNESS: Thank you.

10 MR. GULICK: Your Honor, our next witness is
11 Mr. William Cecil.

12 WILLIAM CECIL,
13 being duly sworn, was examined and testified as follows:

14 DIRECT EXAMINATION

15 MR. GULICK: Your Honor, may I approach the witness
16 and show him how to use the screen?

17 THE COURT: Yes.

18 (Pause.)

19 BY MR. GULICK:

20 Q. Mr. Cecil, you can eliminate those marks on your screen
21 by touching the lower right-hand corner.

22 A. Okay. Is that all I need to know?

23 Q. That's all you need to know, except you can mark, if you
24 want to, by touching the screen with your fingernail, and you
25 can draw a circle or just touch it and put an arrow.

1 A. Okay. Thank you.

2 Q. Would you please state your full name.

3 A. William Amherst Vanderbilt Cecil, Jr.

4 Q. Where do you live, Mr. Cecil?

5 A. I live here in Asheville on Biltmore Estate.

6 Q. And where do you work?

7 A. I work for Biltmore Estate. I'm the president and CEO
8 of the Biltmore Company.

9 Q. What are your responsibilities as president and CEO of
10 Biltmore Company?

11 A. Well, we operate four primary entities under the name of
12 the Biltmore Company, and I'm responsible for all of them.

13 They are the Biltmore House and Gardens; Biltmore Estate
14 Wine Company; The Inn On Biltmore Estate; and what we refer
15 to as Biltmore For Your Home. It's a reproductions program
16 that's sold in places like Belk's and Lowe's.

17 Q. Let's talk a little bit about the Biltmore House. Could
18 you tell us a little bit about what the Biltmore House is.

19 A. Well, Biltmore House is a big house -- it's a big house
20 that was built by George Vanderbilt back in 1890 to 1895, and
21 it was built as a private residence for the Vanderbilts as a
22 way for them to have an oasis, and also as a way to showcase
23 a model farm in western North Carolina. That was part of his
24 vision, was to have an area in western North Carolina, or
25 somewhere in the country anyway, that would be a model farm,

1 for the United States to be able to see that sustainable
2 agriculture was a better model than slash-and-burn
3 agriculture, which was fairly typical at that time.

4 Q. What was your relationship to him?

5 A. He's my great grandfather.

6 Q. At one time, do you know how much property he owned in
7 this area?

8 A. Well, nowadays -- they changed the number back and forth
9 from 128,000 to 124,000 acres, so I'd have to assume -- I was
10 always told it was 128,000 acres, that he owned all the way
11 from where Biltmore House is to Mount Pisgah.

12 Q. That's the family history?

13 A. Yeah, that's the family history.

14 Q. And how much of that land is still part of the estate
15 today?

16 A. Approximately 8,000 acres.

17 Q. And Mount Pisgah is now part of the national forest?

18 A. Yes, sir. Mount Pisgah is part of the Pisgah National
19 Forest. His widow, Mrs. Vanderbilt, sold the land to form --
20 I believe it was 87,000 acres -- the nucleus of the Pisgah
21 National Forest.

22 Q. Now, with respect to the building itself, would you tell
23 us a little bit about the house itself.

24 A. Well, it's about 180,000 square feet. It's the largest
25 privately-owned residence in the United States. We get about

1 1,100,000 visitors a year, is our gate count. Our actual
2 ticket sales are about a little less than that, a million 54,
3 56,000 is what we're forecasting this year. The difference
4 between the gate count and the forecast is the number of
5 12-month pass-holders that we have that are repeat visitors.
6 We count them separately.

7 The house is filled with furnishings from the Vanderbilt
8 era. It's basically been frozen in time to about 1914, when
9 he passed away. We try to create this -- I don't know quite
10 how to say it -- a quasi time travel experience, where you
11 can get away from your daily grind and come up to Asheville
12 and relax and just have a nice time in a perception of a
13 world that was kinder, gentler, you know, no fax machines,
14 cell phones, PDAs, stuff like that.

15 Q. Do you conduct -- as a businessman do you conduct -- do
16 you look at market research to see why people come to this
17 area?

18 A. Yes, I do. I look at research from all kinds of sources
19 and also commission my own research with our guests all the
20 time.

21 Q. And based upon that research, do you know what the
22 primary reasons are that people come to the Asheville area
23 and to the Biltmore?

24 A. We find that the primary reason is the scenic beauty of
25 our area, mountain vistas, views, just the general prettiness

1 of the area.

2 We also find that this oasis, this sense of get away and
3 escape, is huge. We find that there is also a sense of
4 safety here in Asheville that people like, and they come up
5 for the feeling of being safe.

6 Q. Does tourism play a large part of the economic
7 well-being of this community?

8 A. Yes, it does.

9 Q. I'd like to show you what's been marked as Plaintiff's
10 Exhibit 262. It will appear on your screen.

11 And just look at the cover of this, and I'm going to ask
12 you if you are familiar with this document.

13 A. Yeah. It's one of the surveys that the Chamber of
14 Commerce does.

15 Q. Are you a member of the Chamber of Commerce?

16 A. Yeah, I'm a member of the Chamber of Commerce and have
17 been on their board of directors for many years. In fact,
18 this past July ended my year as chairman of the Asheville
19 Area Chamber of Commerce.

20 MR. GULICK: Gary, I'd like to direct our attention
21 to page 18 of this survey.

22 BY MR. GULICK:

23 Q. And are you familiar with this particular page,
24 Mr. Cecil?

25 A. Yes, I am.

1 Q. Would you just sort of tell us what you learned from
2 this?

3 A. Well, consistently, mountain scenery and scenic views
4 are very important to the reasons people visit here. Also,
5 just to see Biltmore. And I think the relaxing is part of
6 that oasis experience that I mentioned just a moment ago.

7 Q. Now, the Biltmore Company is a company. How many
8 employees do you have?

9 A. It varies seasonably, but right now probably around
10 1800. We have a little bit less in the early season, and it
11 grows more, up to about almost 1900 by the time Christmas is
12 upon us. And we start off with festival of flowers in April,
13 and it probably starts about 1700, and we build through
14 there.

15 Our lowest season would be during the winter. We'll
16 have 11 or 1200, being January, February and half of March.

17 Q. Let me show you what's been marked as Plaintiff's
18 Exhibit 260 and ask you if you can identify this document.

19 A. Yeah. That's a front view of the Biltmore House, and it
20 looks like it's on our guidebook. It shows the very front of
21 the house, the main architectural features, and it's taken
22 from about halfway up an area that we refer to as the ramp in
23 front of the house.

24 MR. GULICK: Your Honor, we've provided you a
25 courtesy copy of this document, which is a book.

1 **THE COURT:** I don't seem to have that.

2 **MR. GULICK:** Padron me, Your Honor. I'm about to
3 provide you with a courtesy copy of the book. I apologize.

4 **THE COURT:** All right.

5 **MR. GULICK:** May I approach the clerk?

6 **THE COURT:** Yes, please.

7 **BY MR. GULICK:**

8 **Q.** You had indicated this is the front cover of a book that
9 you published.

10 **A.** Yeah. We call this our guidebook. It's one of our
11 primary retail items. I don't know how much detail you want
12 me to go into, but it's designed around three of our primary
13 guests, and they refer to them as strollers, streakers and
14 studiers, and there's a little bit of each in there. If
15 you're in a hurry, you can read the picture and byline; if
16 you want a little more information, you can read the first
17 paragraph; and if you're just absolutely fascinated by each
18 and every artifact, it's in the back, and you can reference
19 the rooms and the artifacts.

20 It's been a very successful piece for us over the years.

21 **Q.** Thank you. We're going to take just a brief tour of
22 this.

23 **A.** Okay.

24 **Q.** I'd like to go to the page -- electronic page 9 of this
25 document.

1 **MR. GULICK:** And if Your Honor is looking in the
2 hard copy, it is the page facing 9 in the hard copy.

3 **THE COURT:** Yes, I have that.

4 **BY MR. GULICK:**

5 **Q.** And could you just tell us, Mr. Cecil, what we're
6 looking at in this particular picture.

7 **A.** That's a picture of the fireplaces in the tapestry
8 gallery on the first floor of the Biltmore House. Oh, and
9 also, that's a picture of George Vanderbilt on the left
10 there, lower left-hand corner.

11 **Q.** And you indicated, on the walls, you said this was a
12 tapestry gallery. Would you indicate where the tapestries
13 are?

14 **A.** Well, that's one right there; and there is one to the
15 right of the fireplace you see in the upper right-hand
16 corner; and there's one to the far left of the fireplace.
17 You see there's three along that gallery.

18 **Q.** Now I'd like to go to page 30, electronically, which is
19 page 29 of the hard copy, and ask you if you can identify
20 what that is.

21 **A.** Yeah. This is the main banquet hall in Biltmore House.
22 It's the centerpiece of the house where the Vanderbilts held
23 their large banquets. The table seats about 66 people. And
24 the three fireplaces at the end are shown operating. We
25 actually now have natural gas that operates the fireplaces so

1 that we can provide a consistent experience for our guests.

2 We actually took a page out of Disney's book, and we
3 used to have -- the fireplaces were wood-operated, obviously,
4 and they would be beautiful and burn down, and beautiful and
5 burn down, and so we put in natural gas fireplaces so that
6 they would be consistent for each guest as they came through,
7 providing them with a good solid experience.

8 It's a huge room. It's about 70 feet to the ceiling,
9 and we put a 35-foot Christmas tree in there, consistent with
10 what the Vanderbilts did at Christmas.

11 Q. Like to go down to Exhibit 260, which is page 37.

12 A. Okay. That's another view of the tapestry gallery, this
13 time facing toward the library. The previous view was facing
14 toward the concourse at the entrance to the Biltmore -- or
15 the entrance to the main floor. This is the same view but
16 reverse angle, facing in the other direction.

17 Also, it's showing a tapestry there on the right and
18 that really elaborate fireplace design over the mantel of
19 that fireplace. The curators explained to me that that's a
20 type of a tattooing, where you take non-water soluble inks
21 and put them into the limestone and create that.

22 Apparently, according to the National Trust For Historic
23 Preservation, that's an incredible example of that particular
24 technique. And we have -- I was going to say "recently," but
25 it's not so recently now. We restored it in the late 1970s,

1 early 1980s to its original look and feel.

2 Apparently, the difference between really nice and not
3 so nice is the subtle changes in hue across the deer and the
4 other animals that are shown there. Most of them would be
5 all one color rather than fading from one color to the next.

6 Q. Is most of the stone work in the house itself limestone?

7 A. Yes, it is. Well, it's a facing. There is brick
8 underneath, and then the facing all throughout the house,
9 inside and out, is limestone; where it's not wood, anyway.

10 Q. In addition to the house, are there grounds as part of
11 the estate?

12 A. Yeah. The formal gardens are about 475 acres, and that
13 would include the three-mile approach road, which has a
14 ribbon of fine landscaping following the road up to the
15 house. And then we have a formal garden, what they call an
16 English Walled Garden, which is where we put the tulips and
17 the roses and the seasonal planting beds. But we also have a
18 about 175-acre azalea garden with 100 different varieties of
19 native azaleas in there that were collected by a man named
20 Chauncey Beadle back during and after the Vanderbilt era.
21 And then there is a couple other gardens that are associated
22 with the formal garden. One we refer to as The Ramble and
23 one we call The Italian Garden.

24 Q. Thank you. Are guests permitted or invited to walk
25 about the grounds?

1 A. Yes. Guests are actually very much encouraged to walk
2 about the grounds. Back in the '80s we found that only about
3 40 percent of our guests during the summer season -- not
4 spring, but summer season actually got out of their vehicle.
5 Most of them just walked from their vehicle -- rode through
6 the gardens in their vehicle. And now we get about 85 to
7 86 percent of our guests actually put their foot down in the
8 gardens. And that's a huge thing for us. We really think
9 that if you're going to experience this like the Vanderbilts
10 did, you should enjoy the entire estate, not just the lavish
11 furnishings inside Biltmore House.

12 Q. Like to draw your attention to the same exhibit, but
13 this time at page 95.

14 What is depicted in this picture, Mr. Cecil?

15 A. That's one of our woodland trails. We have various
16 degrees of trails, and this one is a woodland trail with the
17 mulch that we put down as wood chips, and then a nice scene
18 passing over a bridge down in one of our gardens. Looks to
19 me like that's going to be in the azalea garden, but I'm not
20 positive.

21 Q. Now I'd like to draw your attention to page 97 of the
22 same document. And can you tell us, Mr. Cecil, what we're
23 looking at here.

24 A. Yes. That's a view of our vineyards. The oak tree in
25 the sort of upper middle right-hand side is the vinyard

1 section that we refer to as Oak Knoll, based on that tree.

2 You're looking at Cabernet Sauvignon at Oak Knoll and
3 Chardonnay grapes in the foreground. I believe we are,
4 anyway. We could be just a little bit to the left of where
5 the Chardonnay is. Oh, there's about 100 acres, in that
6 area. The vineyards -- It's actually about, right now at
7 about 93.7 acres of vineyards the way the wine master counts
8 it, but it's actually about 300 acres of cultivated land.
9 They just don't count anything except for the vines and three
10 feet around the vines, and they add it all up.

11 **Q.** Mr. Cecil, do you, as president and CEO of Biltmore,
12 have concerns about air quality?

13 **A.** Yes, I do.

14 **Q.** Would you briefly tell us what those concerns are? And
15 then you can go back through them and discuss them a little
16 more.

17 **A.** Okay. Well, I primarily -- I was trying to think about
18 this over the weekend. And my concern is when we can't see
19 Mount Pisgah from Biltmore. See, Pisgah was a part of the
20 historic view shed, and if we can't see that, we get an awful
21 lot of discussion, and complaints, really, from our guests,
22 saying why can't I see the mountains, and that scenic vista
23 is the main thing that we look at.

24 **Q.** Was the house situated in a particular way, with an eye
25 towards the view of Mount Pisgah?

1 A. Yes. It's said, according to the family story anyway,
2 that George Vanderbilt's bedroom was located in such a way
3 that he could look over all of his property that he owned
4 from the windows that were in his bedroom, and that Frederick
5 Law Olmstead, landscape architect, and Richard Morris Hunt
6 specifically oriented these views to focus out toward Mount
7 Pisgah.

8 Now, I know that that's not exactly true because if you
9 look out the far right window, you see west Asheville, and he
10 never owned west Asheville. So I think they probably kept
11 those curtains drawn.

12 Q. But does the back of the house, or the front of the
13 house, if you will, actually face towards Mount Pisgah?

14 A. Well, the back of the house -- well, the south terrace
15 faces the best view of Mount Pisgah, which is off of the
16 library. And if you go out off the library terrace where --
17 apparently, the library would have been something very
18 special for his guests at that time. Nobody would have had
19 access to 20,000 volumes of books, except at a university,
20 back in the 1890s, and it would have been very special.

21 And they spent a lot of time in that tapestry gallery
22 that you showed earlier. There is a loge up there that looks
23 out and you can see Mount Pisgah off in the distance; and
24 then the south terrace and the library terrace, you could see
25 Mount Pisgah. Apparently, the guests spent quite a bit of

1 time there enjoying that. It was specifically located to
2 create that oasis, a time to recharge for his friends and
3 family.

4 Q. And you indicated that -- how does air quality affect
5 that experience?

6 A. Well, when there's haze and you can't see Mount Pisgah,
7 and people are either on the rooftop tour, which kind of --
8 the rooftop tour has a little bit of a fear factor in it
9 because you go up a little narrow stairwell and then you open
10 up to a guardrail with the whole world out there behind you,
11 and when you can't see that, they comment about the views and
12 the vistas and how they're disappointed that they couldn't
13 see as well as they had hoped.

14 Q. Do you have -- as president and CEO of the Biltmore, do
15 you have other concerns about air quality?

16 A. Yes. When we get an ozone alert day, we take
17 precautions with our employees very specifically.

18 Several years ago there was something in this area
19 called nonattainment, and we were threatened with
20 nonattainment from EPA or some organization. I'm pretty sure
21 it was EPA. And we took a step to form an Early Action
22 compact, and they told us what we could do locally to reduce
23 the effects if you had one of these alert days. And so we
24 incorporated those steps in our employee training -- what we
25 call BEST training, Biltmore Estate Staff Training -- and we

1 incorporated some of them. They're common sense. But we
2 fuel vehicles early in the morning or late in the day, not in
3 the middle of the day. We also have people hopefully not go
4 out to lunch. You know, if they can bring their own lunch
5 with them, they do. We also have enough flexibility in our
6 schedules that we'll delay or postpone mowing and we'll delay
7 and postpone any kind of farming, agricultural work that we
8 can, whether it be tilling or plowing or just any kind of
9 work with big, heavy tractors, and weed eaters and leaf
10 blowers to the best of our ability. We can delay a lot of
11 that work. It won't hurt one or two days to stop that.

12 Q. And the purpose of this is what?

13 A. Well, the purpose is to be responsible local corporate
14 citizens and try and reduce the intensity of one of these
15 alert days that comes up from time to time.

16 Now, the other things we do is, also, we have specific
17 things to look out for our employees who are outside,
18 particularly outdoor staff. We give them more frequent
19 breaks. And also -- and this I just really discovered
20 recently -- we have a lot of elderly drivers in our shuttle
21 bus programs, and those drivers need extra breaks during
22 these ozone alert days, at least according to the supervisors
23 in those departments. They regularly schedule about
24 30 percent more breaks during these days.

25 Q. As president and CEO of Biltmore, do you have concern

1 about air pollution with respect to the health of your
2 employees and guests?

3 A. Yes, I do. We monitor our employees and keep an eye on
4 our guests. And when I say "keep an eye on our guests," we
5 have a lot of stairs inside Biltmore House, and we also have
6 a pretty long walk from the gardens back to the parking,
7 where you were parked. About three years ago, however, we
8 started shuttling anybody who wants a shuttle back from the
9 gardens to the parking lot, so back to the front of the
10 house, and then the parking lot shuttle picks them up there.
11 So that has greatly reduced the strain on our guests as they
12 walk back to the parking lot.

13 Q. There are elevators in the Biltmore?

14 A. Yeah. We have two elevators. One is licensed as a
15 service-only elevator and has to be operated by somebody.
16 It's actually the oldest operating Otis elevator in the
17 country. It's kind of cool.

18 Q. Did that get more use in that area?

19 A. No, I don't think so. We get an awful lot of use in
20 that for strollers and wheelchairs and generally older guests
21 who can't particularly handle the stairs going down. It's
22 knee injuries and stuff that we see most use of the
23 elevators.

24 Q. Do you, as president and CEO of Biltmore, have other
25 concerns about air pollution that you haven't described?

1 A. Yeah. We have an awful lot of horses in our trail ride
2 program, and carriage horses or draft horses in our programs,
3 and in the past we've had a couple that really had breathing
4 difficulties and we had to take them out of service,
5 particularly the draft horses. But for a long time we had
6 this one horse, who is now retired, and we just immediately
7 took him out of service. He would make this horrible
8 wheezing sound on certain really hot, you know, hazy days.
9 And so we'd take him out of service. But we watch the staff
10 and the guests as well, but in that case the horse does most
11 of the work.

12 Q. I'd like to show you what's been marked as Plaintiff's
13 Exhibit 255. And just tell us a little bit about what this
14 shows.

15 A. Okay. That's the front view of the Biltmore House
16 again, and it shows the distant mountains in the background.
17 Also, it shows just the whole view of the house, and that's
18 taken on a very pretty day.

19 Q. Like to ask you now, do you have any concerns about the
20 affect of air pollution on the property itself?

21 A. Yes, I do. The curatorial staff spends a great deal of
22 money -- I like to say it's a great deal of energy, but it's
23 the same thing. And they have -- or I have, I guess -- we
24 have commissioned studies of various things on the house, and
25 we find that the copper gutters and the copper roof lines,

1 particularly the metal, have been affected by what they
2 describe as acid rain.

3 Q. And could you point out for us -- are those visible on
4 this photograph?

5 A. Yes, they are. Some of the worst areas actually aren't
6 terribly visible, but I can point out where I'm talking
7 about.

8 The ridge line right there is one of the areas, and then
9 this ridge line across here is also affected.

10 Q. Okay. If you could clear your -- oh, there you are.

11 What is the copper -- is that the green?

12 A. Yeah, that's the green part above the slate roof.

13 That's copper. The green in and of itself isn't a bad thing.

14 But here is a place you can actually see -- if you can show
15 it. Right there is a valley. I just pointed out a valley.

16 It's where the roof lines come together and form a V. That's

17 where we find that we get the most damage in the form of

18 pitting, and we, since the 1980s, really about '85, '86, our

19 director of house operations, Rick King, has coined a phrase

20 that he likes to call beaver chipping, in that we keep

21 working at it year after year after year, and we put about 25

22 to \$30,000 a year into replacing those copper gutters so as

23 to never get water inside Biltmore House. One of our biggest

24 fears is that all of us will not outlive the slate roof.

25 None of us want to be in charge when the slate roof has to be

1 replaced. And so we're all hoping to do just every bit we
2 can to not have to do that, and keeping the water out of the
3 house is number one there.

4 **Q.** Back up and look at the whole again.

5 You had indicated earlier that the stone facing on the
6 house is made of limestone?

7 **A.** Um-hum. Yes. We do find where water does touch the
8 house that we'll have some -- I don't know if the right word
9 is etching. It's more discoloration. You'll have a very
10 white and a very dark area as the water runs off the house.

11 **Q.** And do you have -- do you have a curatorial staff to
12 assist you in the operation of the house and the estate?

13 **A.** Oh, yes, sir.

14 **Q.** And what is the cause of that etching that you
15 described?

16 **MS. GILLEN:** Objection, Your Honor. This is a fact
17 witness.

18 **THE COURT:** Overruled. You may answer.

19 **THE WITNESS:** Excuse me?

20 **THE COURT:** You may answer.

21 **THE WITNESS:** Oh. They tell us that it's the acid
22 rain.

23 **BY MR. GULICK:**

24 **Q.** I'd like to show you what's been marked as Plaintiff's
25 Exhibit 256 and just ask you, is this one of the horse

1 carriage trails and the horses that you were talking about?

2 A. Yes. This is actually a special event that we did where
3 we invited the U.S. -- Carolina Carriage Association as part
4 of the U.S. Carriage Association, to a special event. This
5 isn't one of our typical trails. This is one of our guest
6 roads down to the lagoon, showing the west side of the
7 Biltmore House.

8 But this is not typical with what we do with our guests
9 when we charge them for carriage rides. We find that they
10 like the smaller private carriages. We used to do these big
11 kind of wagon rides with 10 or 15 people, and it wasn't
12 unusual to have them pay for the entire wagon ride just so
13 one family could go or boyfriend and girlfriend could go on a
14 romantic kind of time-travel experience.

15 Q. And I'd like to look at page 2 of Exhibit 257.

16 A. Is there a way to remove my marks on there?

17 Q. Yes. Bottom right-hand corner.

18 A. Bottom right. There we go. Thanks.

19 That's a picture at the lagoon, sort of a similar
20 picture from where the carriages were, just in a different
21 angle. That's actually very close to where a movie was
22 filmed with -- what was it called -- "Being There," with
23 Peter Sellers, and he walked out into the water pretty close
24 to there at the end of the movie.

25 Q. And does this appear to be a fall day?

1 A. Yes, it does. And a very pretty fall day.

2 The only time this picture gets even prettier is when
3 there is no wind at all and you can see the complete
4 reflection of Biltmore House in the lake, and that's what
5 they were going for with that movie, and they were very
6 successful in catching that. This picture doesn't quite
7 catch it as well.

8 Q. Now I'd like to show you Plaintiff's Exhibit 259 and ask
9 if you can identify it.

10 A. That's a picture of -- appears to be a picture of the
11 loge off the south of Biltmore House, or southeast part of
12 Biltmore House. That's the area that's like a porch that's
13 off of the tapestry gallery.

14 A lot of our guests go out there, and we offer them
15 chairs that are quite comfortable that are not part of our
16 artifacts. We used to let people sit in all the old chairs,
17 and after a million people a year sit in them, they don't
18 hold up so well, so we regularly replace new chairs and we
19 allow people to take a break from their tour on the loge and
20 enjoy these kind of views. This is a very pretty fall day
21 and a little bit closer to peak color than we see in the
22 previous picture.

23 Q. And in this picture, what are the mountains we're seeing
24 in the background?

25 A. Well, we're seeing the range to the south. If that

1 pillar wasn't quite right in the way, we'd probably be seeing
2 Mount Pisgah, which is, I believe, pretty close behind that
3 pillar, but I'd have to go out there to be sure about that.

4 It could be -- no, I'm pretty sure it's behind that pillar.

5 Q. And this is a very clear day. Is that always visible
6 from the loge?

7 A. No. Mount Pisgah is not always visible, and that's when
8 we get concerned and we also see the complaints that I
9 mentioned from the guests who take our rooftop tour and
10 behind-the-scenes tour because that includes the upper areas
11 of the house where they can see the longest distances.

12 Q. How bad can the haze be?

13 A. Well, I mean, some days if you look from the loge and
14 you look toward the farmer's market, which is about two and a
15 half, three miles away, there's days when you can barely see
16 the farmer's market at the intersection of I-40 and I-26.
17 That's the ones when we get really kind of concerned. And
18 those kind of days when you can barely see the farmer's
19 market is the days when we see a lot more complaints from our
20 guests.

21 Q. How far away is Mount Pisgah, roughly?

22 A. I'm told it's 17 miles as the crow flies, which is a
23 straight line from the house.

24 Q. Like to show you Plaintiff's Exhibit 258 and ask you if
25 you can identify it.

1 A. This is a picture from the library terrace, which is
2 just adjacent to the south terrace, in between the south
3 terrace and the loge. It's a right off the back side of the
4 house, very close to where we just saw, but without the
5 pillars in it, also in fall colors and on a pretty day.

6 This area is an area we refer to as the Deer Park,
7 especially if you move the picture just a little bit to the
8 right. And you can barely see the lagoon, which is where you
9 saw the picture from that water back up toward the back side
10 of the house. Barely see it. Right about in that area,
11 right there. And you see deer in the afternoon come out
12 there. And a lot of our guests from the cities, from
13 Atlanta, Raleigh, Charlotte, they get very excited when they
14 see white tail deer and wild turkey in this field. And you
15 can see them on a fairly regular basis.

16 Q. As a result of your concerns about air pollution, have
17 you, as president and CEO of the Biltmore Company, taken any
18 steps to take action with regard to air pollution?

19 A. Yes, I have. As a board member of the Chamber of
20 Commerce, several years ago, when we were trying to get the
21 Clean Smokestacks bill passed, I got the Chamber of Commerce
22 to pass a resolution, just in general, supporting clean air
23 and air quality. I actually received a phone call later from
24 the U.S. Chamber of Commerce explaining to me that I
25 shouldn't have done that, but we did because we felt it was

1 important. And the resolution was passed during that whole
2 process leading up to the Clean Smokestacks bill.

3 I also worked with the Environmental Defense Fund -- I
4 believe they're now called Environmental Defense -- at the
5 request of my mother, who was a very strong proponent for
6 nature conservancy and environmental defense and all of this.
7 And I went to Washington and testified on behalf of western
8 North Carolina for something that the EPA referred to as
9 BART --

10 Q. Best Available Retrofit Technologies?

11 A. Best Available Retrofit Technologies.

12 Q. And about when was that? As best you can remember.

13 A. That was -- it was after 2001, because I worked with
14 Congressman Taylor to help present his general accounting
15 office report in May of 2001 that talked about kind of a
16 snapshot of air quality at that time, and I was the moderator
17 over at Diana Wortham theater when that was presented to the
18 public in his district, and it was after that, because the
19 BART testimony went -- I included that information in the
20 packet of information that I gave as a leave-behind in
21 Washington. But it was in that time frame, 2001 or 2.

22 Q. Mr. Cecil, does air quality in this area still need
23 improving?

24 A. Well, recently, I might have answered that question a
25 little differently, but this very hot air that we've had in

1 early June -- we've had quite a few days in early June where
2 we had real significant problems with haze, and in the past
3 week or so we've had another few days where we've had some
4 really significant problems with haze.

5 As I was talking to my family about this opportunity to
6 be here in court today, I was, you know, sitting on the back
7 porch of our house, and you could see the farmer's market,
8 but it was really hazy. You could not see Mount Pisgah
9 yesterday evening. And we were talking about that. You
10 know, I think it could always be improved, and it's very
11 important to us.

12 **MR. GULICK:** Thank you. I have no further
13 questions, Your Honor.

14 **MS. GILLEN:** Thank you, Your Honor.

15 **MR. GULICK:** I apologize, Your Honor, I need to
16 move into evidence for illustrative purposes several exhibits
17 that we looked at, and these include Exhibits 255, 256, 257,
18 258, 259, 260, 261 -- excuse me -- correction. Not 261.
19 262. And I'd like to move those into evidence for
20 illustrative purposes, Your Honor.

21 **THE COURT:** All right. Let those be admitted.

22 **(Plaintiff's Exhibits 255 through 260, and 262**
23 **received.).**

24 **MS. GILLEN:** Your Honor, we have no questions for
25 Mr. Cecil. Thank you.

1 **THE COURT:** Thank you. That will complete your
2 testimony, and you are excused, Mr. Cecil.

3 **THE WITNESS:** Okay. Thank you.

4 **MR. GULICK:** Your Honor, the next witness the State
5 would call is Mr. Eric Plakanis.

6 **ERIC PLAKANIS,**
7 **being duly sworn, was examined and testified as follows:**

8 **DIRECT EXAMINATION**

9 **BY MR. GULICK:**

10 **Q.** Good morning.

11 **A.** Morning.

12 **Q.** Please state your full name, Mr. Plakanis.

13 **A.** Eric Scott Plakanis.

14 **Q.** Plakanis. Excuse me. I've been mispronouncing your
15 name since I met you.

16 **A.** Very common.

17 **Q.** Where do you live, Mr. Plakanis?

18 **A.** Outside of Gatlinburg, Tennessee.

19 **Q.** And how long have you lived there?

20 **A.** For about ten years.

21 **Q.** What is your occupation, Mr. Plakanis?

22 **A.** I'm a trail guide and owner of a guide service in the
23 Great Smoky Mountains National Park called A Walk In The
24 Woods.

25 **Q.** And tell us a little bit about the Walk In The Woods,

1 what it is.

2 **A.** Well, we offer a wide range of services to help people
3 enjoy the Great Smoky Mountains National Park. Primarily, we
4 lead interpretive walks, everything from very short walks to
5 day hikes and multiple-night backpacking trips; but we also
6 provide support services to other hikers and backpackers,
7 like offering shuttle service and equipment rental.

8 **Q.** And is this the only thing in your profession?

9 **A.** No.

10 **Q.** What did you -- what used to be your profession?

11 **A.** For a period of time, I was a financial accountant --
12 financial controller at a video post-production house in
13 Atlanta, for about ten years.

14 **Q.** And what brought you to this change in profession, if
15 you will?

16 **A.** Well, my wife and I have always loved the outdoors, and
17 we wanted to do something that felt a little more meaningful
18 with our lives, and sharing and introducing people to the
19 wonders of the natural world felt a lot more important than
20 what we were doing.

21 **Q.** In running your business, Mr. Plakanis, does air
22 pollution affect your business?

23 **A.** Yes.

24 **MS. COOPER:** Your Honor, I'm going to object to
25 that. It's an opinion by a fact witness.

1 **MR. GULICK:** Your Honor, I'm not asking his
2 opinion. I'm asking if it affects his business. Seems to me
3 he's entitled to answer that question.

4 **THE COURT:** The objection is overruled. You may
5 answer.

6 **THE WITNESS:** Yes.

7 **BY MR. GULICK:**

8 **Q.** Could you tell us the way or ways in which it affects
9 your business.

10 **A.** Let's see. In many different ways. One very direct way
11 is that on days like today, where we have an air quality
12 alert in the Great Smoky Mountains National Park, we cannot
13 bring our clients into the upper elevations or do strenuous
14 programs.

15 So, like, on Friday, where we had a trip scheduled to go
16 to the top of Mount LeConte and back down, we had to cancel
17 that and try to reschedule it.

18 In addition, it just makes our job a lot harder. On a
19 great visibility day, no matter what we're doing, our clients
20 love it. When visibility is poor, we have to work a lot
21 harder to try to awaken the enthusiasm that is naturally
22 there on a great visibility day.

23 **Q.** Had you personally ever had an experience relating to
24 health as a result of air pollution?

25 **A.** I did.

1 Q. Would you tell us about that experience?

2 A. In May of 2000, I was guiding a backpacking trip in the
3 eastern part of the Great Smoky Mountains National Park, and
4 on the second day, we were going from Walnut Bottoms, at
5 about 3,000 feet, up to Mount Sterling, which is a little
6 under 6,000. And after an hour or two into the hike, I lost
7 my breath. We were going uphill, so that's not an uncommon
8 thing. So I took a little break to recover. But then, once
9 I started hiking again, I didn't get another hundred yards
10 before I lost my breath again. And this time we took a
11 five-minute break, dropped our packs, sat down for a little
12 while. And then when we started again, I didn't get a
13 hundred yards until I lost my breath. It was very difficult
14 for me to get air. And at that point I was getting very
15 nervous because I was responsible for the people backpacking
16 with me.

17 And that situation just continued to deteriorate. And
18 we took a long lunch break, you know, sat down for an hour.
19 And even after that, immediately after we started going
20 again, the problem continued. And once we finally limped
21 into camp, even that night, it continued until sometime
22 during the evening. It was like something changed and all of
23 a sudden I could breathe again, and I was able to continue
24 the rest of the trip without incident.

25 Q. Did you learn what the air quality was on that day?

1 A. Yeah. We weren't that aware of the air quality issues
2 back then. When I came off the trail, there were articles in
3 the local newspaper talking about how high the ozone levels
4 were during my trip, and that's really when we became very
5 aware of the ozone situation.

6 Q. Is that affecting how you handle your customers and what
7 kinds of trips you take them on when there are ozone alerts?

8 A. It certainly does. Now, you know, every morning we
9 print out a report that not only has the weather forecast; it
10 has information about the visibility and air quality.

11 And, you know, this weekend has been a tough one for us
12 because of the very poor air quality. Every group that we
13 met, we had to discuss those implications with them and how
14 it may affect them. And like you mentioned, we had to
15 reroute some trips.

16 Q. Do you give tours in both the Tennessee and North
17 Carolina parts of the park?

18 A. Yes, sir.

19 Q. Have you actually had -- I think you indicated that your
20 customers were disappointed if they didn't have good views.
21 Is that your experience?

22 A. Absolutely. You know, we do some trips over and over
23 again, and we'll take them to some great vista points, places
24 like Charlie's Bunion, Rocky Top, Mount Cammerer, and on good
25 visibility days, you can just see the excitement, the

1 enthusiasm. On those days, it will be hard to get them to
2 leave, to go on to continue the trip. But on poor visibility
3 days, people get there, you know, step on Charlie's Bunion,
4 look around, and it's like, okay, fine, I'm ready to go now.

5 In fact, we sort of changed the pacing of our trip based
6 on the visibility because we'll know people want to spend
7 more time at those vistas on good visibility days.

8 Q. Have you ever seen or experienced, if you will, any kind
9 of monetary effect as a result of that?

10 A. Certainly. We also run backpacking trips on the
11 Appalachian Trail for REI adventures, and I get to do
12 approximately two of those a month. And last year it just
13 happened that there was sort of a little experiment set up,
14 because our primary route starts from Newfound Gap and covers
15 the east side of the Appalachian Trail, but there were two
16 trips early on that had to do the other side of the park, and
17 those were the two we had there.

18 With those REI trips, the clients get a questionnaire to
19 rate the quality of their experience and the quality of their
20 guides, and on both of those trips, we received the highest
21 scores, sevens, all the way down the line. The difference
22 was, on the first trip, the visibility was very good; on the
23 second trip the visibility was poor. And on the first trip,
24 we were tipped over \$600. The second trip was more -- was
25 less than \$200.

1 And so there is just a situation where we both did the
2 identical trail, same shelters, everything, less than a month
3 apart; the main difference was that intangible, because both
4 those trips, each client was very happy with the service,
5 very happy with the trip, and the only big difference was
6 that visibility.

7 Q. Now, you live in Tennessee; is that correct?

8 A. Correct.

9 Q. Do you have concerns about air quality in Tennessee?

10 A. I have great concerns. You know, my wife and I have
11 built this business and, for us, it's our dream job. We are
12 making a living doing what we absolutely love. But each year
13 we have to make a decision if we want to do this another
14 year. Because we're guinea pigs. We are guinea pigs on what
15 happens when you spend a lot of time in a high-ozone
16 condition exerting yourself.

17 Q. Have you ever had occasion when the visibility in the
18 park has been really great?

19 A. Yes. A few years ago our park was impacted by two
20 hurricanes, and as the second one was coming in, as a
21 precautionary measure, the park closed a bunch of roads and
22 all their campgrounds. But that second hurricane sort of
23 petered out, it didn't affect us that badly, and we had
24 already canceled all our work, so I was off. And when it
25 went through, the sky cleared and I took that opportunity to

1 hop in the car and go up to Clingman's Dome, and it was
2 spectacular. The sky was a -- just a deep shade of blue and
3 as far as you could see in the sea of mountains surrounding
4 us, the mountains were crisp and green. It really was a
5 spiritual experience. I'd never experienced that before.

6 **MR. GULICK:** Thank you. I have no further
7 questions.

8 **THE COURT:** Questions?

9 **MS. COOPER:** Your Honor, I just have a few
10 questions.

11 **THE COURT:** Yes. Fine. Go ahead.

12 **CROSS EXAMINATION**

13 **BY MS. COOPER:**

14 **Q.** Mr. Plakanis, you're a member of the National Parks
15 Conservation Association; is that correct?

16 **A.** Correct.

17 **Q.** And that's an advocacy group for environmental causes;
18 is that a fair statement?

19 **A.** I think so, yes.

20 **Q.** Now, in connection with a lawsuit that the National
21 Parks brought against TVA, you submitted an affidavit. Do
22 you recall that?

23 **A.** Yes.

24 **Q.** And that affidavit was in September of 2001; is that
25 correct?

1 A. That I wouldn't know.

2 Q. But it was a number of years ago?

3 A. Number of years ago, correct.

4 Q. Now, in your affidavit, I represent to you, you said
5 that you had been operating your business for two and a half
6 years at that time. And so that would be consistent with
7 2001; is that true?

8 A. We started business in 1998.

9 MR. GULICK: Your Honor, I wonder -- excuse me.
10 Your Honor, I wonder if he might be shown a copy of what he's
11 being asked about, if it's a document that he signed.

12 THE COURT: Yes. You do not have a copy?

13 MR. GULICK: We do not have a copy.

14 THE COURT: All right. Let's see if we can furnish
15 him one.

16 BY MS. COOPER:

17 Q. All right. Is that your signature, sir, on the bottom?

18 A. Not yet.

19 Q. On the bottom of the page?

20 Is that your signature, sir, on the bottom of the page?

21 A. Yes, it is.

22 Q. And it's dated, January 4, 2001; is that correct?

23 A. Yes.

24 Q. All right. Now, if you take a look at the top of the
25 page, it says: "We are seriously considering moving" --

1 "considering the possibility of moving our business to
2 another location." Is that correct?

3 A. That is correct.

4 Q. And that was because, in 2001, you were concerned about
5 the air pollution.

6 A. Correct. The effects of the air pollution on us and our
7 daughter, correct.

8 Q. But now it's 2008 and you're still there, correct?

9 A. That is correct.

10 Q. Now, in 2007, is it true that your business accommodated
11 some 22,000 people, or perhaps slightly more?

12 A. I think what that means is up till 2007.

13 Q. Cumulative.

14 A. Cumulatively, that's correct.

15 Q. And by 2008, the number was up to 27,000 people; is that
16 correct?

17 A. That is probably correct. It's in the ballpark.

18 MS. COOPER: Thank you very much.

19 I have no further questions, Your Honor.

20 THE COURT: All right.

21 MR. GULICK: No redirect, Your Honor.

22 THE COURT: All right. Thank you, sir, and that
23 will complete your testimony and you may be excused.

24 THE WITNESS: Thank you.

25 MR. GULICK: Your Honor, we next call to the

1 witness stand Mr. Don Barger.

2 **THE COURT:** All right.

3 **DONALD BARGER,**

4 **being duly sworn, was examined and testified as follows:**

5 **DIRECT EXAMINATION**

6 **MR. GULICK:** Your Honor, if I might be allowed to
7 approach this witness and show him how to use the screen?

8 **THE COURT:** All right, sir.

9 **THE WITNESS:** Thank you. I'm a dummy with this.

10 **MR. GULICK:** You can draw on the screen. If you
11 see something you want to point out, you can point it out
12 like that, just touch it. And then to clear one of the last
13 things, touch there. To clear them all, you touch there.

14 **THE WITNESS:** Good. Thank you very much.

15 **BY MR. GULICK:**

16 **Q.** Could you please state your full name?

17 **A.** My name is Donald Paul Barger.

18 **Q.** Where do you live, Mr. Barger?

19 **A.** I live in Norris, Tennessee.

20 **Q.** And is that near a larger city?

21 **A.** Yes. It's about 20 miles outside of Knoxville.

22 **Q.** And in what direction?

23 **A.** North of Knoxville.

24 **Q.** How long have you lived there?

25 **A.** I've lived there since 1992.

1 Q. What is your occupation, Mr. Barger?

2 A. I am the Southeast Regional Director of the National
3 Parks Conservation Association.

4 Q. Tell us what the National Parks Conservation Association
5 is, please.

6 A. Yeah. The National Park's Conservation Association, or
7 NPCA, was created in 1919, three years after the creation of
8 the National Park Service. It is an advocacy organization.
9 Our mission is to preserve and enhance America's national
10 parks for present and future generations. We do advocacy
11 specifically aimed at mobilizing public support for the
12 protection of our national parks.

13 Q. Within the scope of the region that you are responsible
14 for for the association, what are some of the major national
15 parks that come to mind?

16 A. Well, certainly, the Great Smoky Mountains National
17 Park. There are, in the southeast region, about 50 or so
18 units of the National Park System that fall under our sort of
19 area of jurisdiction, within the Southeast Regional Office.
20 It's everything from Hot Springs National Park to Mammoth
21 Cave National Park to -- actually, about 60 percent of the
22 units of the National Park System are historic sites. So as
23 well as national parks, there are a lot of historic parks,
24 battlefields, and other units managed by the National Park
25 Service.

1 Q. Are there any Class I areas, as that's defined under the
2 Clean Air Act, within your jurisdiction, if you will?

3 A. Yes, there are. There are two Class I areas in my
4 region that are managed by the National Park Service.
5 They're Great Smoky Mountains National Park and Mammoth Cave
6 National Park.

7 Q. Where is Mammoth Cave National Park?

8 A. It's in western Kentucky.

9 Q. And to your knowledge, is the Applachian National Scenic
10 Trail a unit of the National Park Service?

11 A. Yes, it is.

12 Q. Tell us a little bit about what the National Park
13 Service is.

14 A. Well, three years before the creation of NPCA, in 1916,
15 Congress created and President Woodrow Wilson signed the
16 Organic Act of the National Park System. It was the first of
17 its kind in the world. It's essentially our nation's first
18 commitment to sustainability, the first time that we ever
19 said that some areas were so special they needed to last
20 forever and they needed to belong to everybody.

21 The mission statement that Congress put into the Organic
22 Act for the National Park Service is to conserve the scenery
23 and the natural and historic objects and the wildlife therein
24 and to provide for the enjoyment of the same in such manner
25 and by such means as will leave them unimpaired for the

1 enjoyment of future generations.

2 Q. And what is the relationship, if any, between the
3 National Parks Conservation Association and the National Park
4 Service?

5 A. There is no formal affiliation between -- we are a
6 non-governmental organization.

7 Q. When you say "we," you mean?

8 A. NPCA is a non-governmental organization.

9 Several years ago I took a reporter hiking in the
10 Smokies, and he kind of put a moniker on us that stuck. He
11 said that NPCA was the Park Service's chief advocate and
12 critic. As a public advocate, our role is to advocate for
13 the preservation and protection of the parks and not the
14 National Park Service.

15 So, you know, our job is to try to determine what issues
16 are affecting the national parks, you know, and help
17 determine their long-term viability to be protected and
18 unimpaired for future generations and to advocate for those
19 measures of protection.

20 Q. So was his description accurate?

21 A. I would say so.

22 Q. I'd like to show you what has been marked -- in fact,
23 it's already been admitted -- as Plaintiff's Exhibit 174.

24 MR. GULICK: Your Honor, I believe this particular
25 document has already been admitted into evidence.

1 **THE COURT:** All right.

2 **MR. GULICK:** Your Honor, actually, this particular
3 document is rather faint on this screen, and I'd like to --
4 Your Honor, you may find that it's in the -- there is a --
5 you received a book from Lyle Chinkin. It was a Lyle Chinkin
6 binder. And there's probably a better copy of it available
7 there to see than is on the screen.

8 **THE COURT:** All right. Thank you.

9 **MR. GULICK:** Sometimes this technology fails us,
10 Your Honor, and I wonder if I might approach the witness and
11 give him a better copy of this as well.

12 **THE COURT:** All right.

13 **MR. GULICK:** May I approach the witness, Your
14 Honor?

15 **THE COURT:** Yes.

16 **BY MR. GULICK:**

17 **Q.** Before we look at this document, Mr. Barger, I was
18 wondering if you could just briefly outline for us what
19 concerns you may have.

20 **MR. GULICK:** At least put it up on the screen so he
21 can illustrate what he's talking about, looking at the
22 document itself.

23 **BY MR. GULICK:**

24 **Q.** I'll ask you, what concerns does the National Parks
25 Conservation Association have, if any, with regard to air

1 quality in the national parks?

2 A. Well, you know, I began my job in 1992, so I've been
3 doing this for 16 years, and very shortly after coming into
4 the job and beginning to explore, I learned that air
5 pollution was one of the most dramatic problems affecting
6 Great Smoky Mountains National Park and, in fact, a lot of
7 the other parks in the region. Of the 391 units of the
8 National Park System, 150 of those are in areas that are
9 designated as nonattainment for one or more pollutants. So
10 park visitors are obviously being exposed to high levels of
11 pollution in lots of places throughout the system.

12 In particular, with Great Smoky Mountains National Park
13 and Mammoth Cave National Park, since they are Class I areas
14 in my region, I began to look at what the impacts were and
15 what the levels of protection are supposed to be of those
16 parks.

17 Three of the principal issues that are of great concern
18 to NPCA are visibility, ozone, and acid deposition, among
19 others.

20 Q. Now, this Exhibit 174 that you have before you is a --
21 is this a document of the National Park Service itself?

22 A. Yes.

23 Q. Are you familiar with this document?

24 A. Yes, I am.

25 Q. Does it address the issues that you've just talked

1 about?

2 **A.** I believe so, yes. Yes, it does.

3 **Q.** Could you just point out in this document where those
4 things are discussed? Just take them one at a time, if you
5 would.

6 **A.** All right. Down at the -- well, at the bottom of the
7 first column on the first page, shrinking views and particle
8 pollution. This is essentially the visibility aspect of
9 this. I think it's -- from our perspective, it's notable
10 that when Congress created the National Park System, the
11 first thing that they said in its purpose is to conserve the
12 scenery. That was the number one mandate from Congress in
13 creating the National Park System.

14 **MS. COOPER:** Your Honor, at this point I would like
15 to interpose an objection to the cumulative nature of this.
16 This particular exhibit has been testified to by both
17 Mr. Chinkin and Mr. Sommerville, and it's only a few pages
18 long. I think this is cumulative testimony.

19 **MR. GULICK:** I don't believe Mr. -- Your Honor, I
20 don't believe that Mr. Sommerville talked about it. However,
21 Mr. Chinkin is not a member of the National Parks
22 Conservation Association, and this is an association that is,
23 as you've heard already, is devoted to addressing issues in
24 the national parks. And his testimony is not going to be
25 very long, so I believe --

1 **THE COURT:** Well, if you have something new to add,
2 that will be fine. Otherwise, let's move along rather
3 quickly.

4 **MR. GULICK:** We'll do that, Your Honor.

5 **BY MR. GULICK:**

6 **Q.** Would you just touch on a few points as to each of those
7 concerns? Then we'll go to the next --

8 **A.** All right. Well, during my lifetime, visibility in the
9 Southern Appalachians has decreased 40 percent in the winter
10 and 80 percent in the summer, and the National Park Service
11 has done a survey which indicates that the number one reason
12 people come to the parks is to see the scenic views. So from
13 the standpoint of visitor experience, again, the Organic Act
14 of the Park Service, specifically, is the central mission
15 that my organization is also concerned about protecting. The
16 annual average visibility in the Smokies right now is
17 33 miles and it should be 113. That's natural visibility.
18 So that particle pollution that produces the haze --

19 **MS. COOPER:** Your Honor, I'm going to object to
20 this testimony. There's lack of foundation, and also, it's
21 cumulative.

22 **THE COURT:** Overruled.

23 **THE WITNESS:** Okay. Continue?

24 **MR. GULICK:** Yes.

25 **THE COURT:** Yes, you may proceed.

1 **THE WITNESS:** Thank you, Your Honor.

2 The principal constituent of the particulate
3 matter -- I'm sure you've probably had testimony about the
4 health effects on that that I won't go into -- is sulfates.
5 Sulfates are responsible for over 80 percent of the
6 visibility impairment in the parks, and three quarters of
7 those sulfates come from coal-fired plants.

8 **THE COURT:** I believe I'll sustain the objection
9 now as to the last answer there --

10 **MR. GULICK:** Thank you, Your Honor.

11 **THE COURT:** -- since that isn't an area in which an
12 average layman can testify.

13 **MR. GULICK:** Thank you, Your Honor.

14 **BY MR. GULICK:**

15 **Q.** I want to draw your attention, if you will, to
16 Plaintiff's Exhibit 276.

17 **MR. GULICK:** Your Honor, this is a document that's
18 already been received into evidence. However, I'm going to
19 draw Mr. Barger's attention to a matter that was not
20 addressed in the testimony of any other witness.

21 **THE COURT:** All right.

22 **BY MR. GULICK:**

23 **Q.** I'd like to draw your attention, Mr. Barger, to page --

24 **MR. GULICK:** It's Bates stamped No. 2358, Your
25 Honor. It's also page 24 of the electronic copy that is now

1 appearing on your screen.

2 **BY MR. GULICK:**

3 **Q.** In particular, Mr. Barger, I want to draw your attention
4 to the bar chart at the top of this document.

5 **MS. COOPER:** Your Honor, I have to object to this.
6 We saw this bar chart at some length in the testimony of
7 Mr. Sommerville.

8 **MR. GULICK:** Your Honor, I'm going to ask him about
9 something that was not addressed by Mr. Sommerville with
10 respect to this bar chart.

11 **THE COURT:** Objection overruled. Go ahead.

12 **BY MR. GULICK:**

13 **Q.** You indicated before that Mammoth Cave was one of the
14 Class I areas in Kentucky that was of concern to your
15 association?

16 **A.** Yes, that's correct.

17 **Q.** Is there any manner touching upon Mammoth Cave,
18 Kentucky, that is addressed in this bar chart?

19 **A.** Yes, absolutely. The light extinction. It's over at
20 the far left of the chart, being the highest light
21 extinction. In fact, the resource we've seen, it is, in
22 fact, the haziest of the Class I national parks that are
23 managed by the National Park Service, meaning it has the
24 highest level of particle pollution.

25 **Q.** And that's what this bar chart shows?

1 A. Yes, it does.

2 Q. Let me ask you a question, since I've never been there,
3 Mr. Barger. Mammoth Cave sounds like a cave. Is visibility
4 actually of concern?

5 A. Mammoth Cave is a cave. It's also 52,000 acres of
6 surface, and the Park Service determined that at least
7 60 percent, or the majority of people who visit Mammoth never
8 go underground. There are 70 miles of trails. There are
9 scenic overlooks of the Green River. Most of the users of
10 the park, in fact, use the surface, and they have one of the
11 National Park Service visibility cameras at an overlook of
12 the Green River.

13 Q. Thank you.

14 Mr. Barger, to your knowledge, are there TVA coal-fired
15 power plants in Kentucky?

16 A. Yes.

17 Q. And there are coal-fired plants in western Tennessee --

18 A. Yes.

19 Q. -- that belong to TVA?

20 A. Yes, there are.

21 Q. I'd like to draw your attention, Mr. Barger, to
22 Plaintiff's Exhibit 146. It's already been received in
23 evidence. And, specifically, Mr. Barger, I was wondering if
24 you could identify for us where on this particular
25 document -- if you can identify on this document --

1 **MR. GULICK:** Your Honor, have you found that
2 exhibit?

3 **THE COURT:** Yes.

4 **BY MR. GULICK:**

5 **Q.** If you could identify on the screen, Mr. Barger, the
6 location of Mammoth Cave.

7 **A.** Approximately. It would be in western Kentucky, right
8 kind of south of that (indicating).

9 **Q.** Where you've marked it on the screen?

10 **A.** Just a minute. I'll try it again. It's going a little
11 bit north of where I'm trying to poke, but let me see if I
12 can -- okay. That's pretty close. (Indicating.)

13 **Q.** So the arrow is pointed to where it actually is?

14 **A.** Yeah, the arrow -- the tip of the arrow. It may be a
15 little bit north of there. Right in that area.

16 **Q.** That's the location of the Mammoth Cave?

17 **A.** Yes.

18 **Q.** I believe -- thank you.

19 I'd like to now draw your attention to Plaintiff's
20 Exhibit 148. And, specifically, there's a second page,
21 closeup of this document. And that's --

22 **MR. GULICK:** Your Honor, have you found that?

23 **THE COURT:** Yes.

24 **BY MR. GULICK:**

25 **Q.** Mr. Barger, where do you live? Can you show us where

1 you live?

2 A. If I can get this to do it. I'm in the lower right-hand
3 corner of that, in the upper end of Anderson County. Right
4 in the edge of that black box is the city of Norris.

5 Q. And that's where your home is?

6 A. That's my home.

7 Q. Could you show us on this particular map -- I apologize.
8 Can you show us on this map again the location of Mammoth
9 Cave?

10 A. Well, I'm going -- it's going to be approximate, but
11 it's -- you come out of Nashville and go up, so it would be
12 right up here. That's a little bit north of -- yes,
13 somewhere up in -- it's probably a little further, but it's
14 difficult for me to get this precisely, but up in western
15 Kentucky.

16 Q. And is the area in which you live a nonattainment
17 county?

18 A. Yes. It's in -- it's nonattainment for ozone and
19 particulate matter.

20 Q. And does that affect your personal life?

21 A. Yes, it does. The city of Norris is actually a
22 wonderful place to live. It was built by the Tennessee
23 Valley Authority in the 1930s. It was a planned community.
24 And the plan still works in community life. And one of the
25 things that TVA did was set aside the Norris watershed, which

1 is our source of water, and it's also a recreational area
2 that all of the residents of Norris use regularly and very
3 much appreciate.

4 Q. And does it -- but does air pollution affect your life
5 there?

6 A. Well, absolutely. I mean, today, we are again in
7 exceedance for both ozone and particulate matter. Yesterday
8 evening, it was difficult even to get out. I had two
9 separate people comment to me, one person with asthma who
10 said she had been using her inhaler all day, and another
11 person, perfectly healthy, said the air just felt thick. And
12 on those kinds of days, it's very difficult to get out and
13 enjoy the outdoors. That is the sort of nature and basis for
14 the area.

15 Q. Do you use trails in the area that you live?

16 A. Yes, I do. In addition to the Norris watershed, I hike
17 extensively in the Great Smoky Mountains National Park, along
18 sections of the Appalachian Trail, the Big South Fork River
19 and Recreational Area.

20 Q. Let's show you what's been marked as Plaintiff's Exhibit
21 149. And can you again show us where it is that you live?

22 A. Yeah. Up here in the very tip of Anderson County, where
23 you see the green, that's probably Norris Dam, or Norris Dam
24 State Park, and that's very close to the city of Norris.

25 Q. Now, you just indicated that you hike on the Appalachian

1 Trail.

2 A. Yes.

3 Q. What portions of the Applachian Trail have you hiked on?

4 A. I've done about two-thirds of the Applachian Trail, from
5 Mount Rogers, Virginia, to its southern terminus in Georgia.

6 Q. Could you just sort of indicate those points on the
7 screen?

8 A. Yes. Mount Rogers, Virginia, is right there, and then
9 the southern terminus of the Applachian Trail is here.

10 Q. Most of that length is where?

11 A. It runs along the Tennessee/North Carolina border for a
12 long ways, and then goes into Tennessee on its northern trek,
13 up to Damascus, Virginia, across North Carolina, and into
14 Georgia on its southern end.

15 Q. Finally, if you could take a look at Plaintiff's Exhibit
16 No. 156.

17 Now, again, I'd like to ask you if you can identify
18 where on this map that you live.

19 A. Right there (indicating).

20 Q. Do you know whether or not the county in which you live
21 has been in nonattainment for ozone?

22 A. Yes, it has.

23 Q. And do you hike in the area of your town?

24 A. Yes. That's -- the Norris watershed is essentially
25 attached to downtown. I can walk out of my driveway and walk

1 about a quarter of a mile and I'm in the Norris watershed.

2 **Q.** As a result of air pollution, have you had to -- has
3 that affected your walking schedule outside?

4 **A.** It does. At the valley level, the ozone levels are much
5 worse in the afternoon, which is different than the mechanism
6 in the mountains. So, you know, you try to get exercise of
7 that nature early in the day if possible during the summer
8 months. Sometimes that's not possible.

9 **Q.** When you came into the courtroom, you handed me a
10 document, and I'm going to ask you some questions about that;
11 but I only have one copy of this so I'm going to show it to
12 counsel for TVA, and then I'm going to have to put it up on
13 this machine, which I've never done.

14 **A.** Okay.

15 **MR. GULICK:** Your Honor, this is a document that
16 was just handed me by the witness when he came in and I only
17 have one copy. I'll allow counsel for the defendant to view
18 it before I show it to Your Honor.

19 **THE COURT:** All right. If you can put it up so we
20 can all view it at the same time, and then provide counsel a
21 copy --

22 **MR. GULICK:** We will do that, Your Honor.

23 **THE COURT:** -- so they will have it to work with.

24 **MR. GULICK:** May I go to the overhead viewer?
25

1 BY MR. GULICK:

2 Q. What I'm showing you, is this the document that you
3 handed to me when you came in the courtroom this morning?

4 A. Yes, it is.

5 Q. And can you tell us what this document is and how it --
6 when it came into your possession and how it came into your
7 possession?

8 A. It's a copy of an e-mail. I'm on a distribution list
9 for Great Smoky Mountains National Park for air quality
10 alerts, and this is an alert that the National Park Service
11 has issued to its employees, and also to partners and other
12 people that they think may be in the park, of both an ozone
13 and particle pollution advisory. This was for yesterday. I
14 checked the website this morning and we're in violation of
15 the particle pollution again, so I'm assuming there may be
16 another one today. The day before, they had a similar one,
17 but it was just for ozone.

18 And what it basically says is they are encouraging their
19 staff to refrain from strenuous or prolonged physical outdoor
20 activities, don't do anything outside where you'd have to
21 breathe hard.

22 Q. And this indicates that it's from Jim Renfro. Do you
23 know who Jim Renfro is?

24 A. Yes, I do. He's the Air Resource Specialist for Great
25 Smoky Mountains National Park.

1 **MR. GULICK:** Your Honor, I've put an exhibit
2 sticker on this which marks it as Plaintiff's Exhibit 488.

3 **THE COURT:** 488? All right.

4 **MR. GULICK:** 488, Your Honor. Thank you.

5 Your Honor, at the next break we will make copies
6 of this document for the Court and for defendant's counsel.

7 **THE COURT:** All right.

8 **BY MR. GULICK:**

9 **Q.** Mr. Barger, you indicated that you started with the
10 National Parks Conservation Association in 1992, I believe
11 you said.

12 **A.** That's correct.

13 **Q.** Were you involved with the effort known as Southern
14 Appalachian Mountain Initiative?

15 **A.** Yeah, SAMI. Yes, I was. I represented NPCA in the SAMI
16 process for the ten years of its existence.

17 **Q.** And did you do that as a representative of the National
18 Parks Conservation Association?

19 **A.** That's correct.

20 **Q.** Mr. Barger, you were telling me the other day about this
21 being a consensus process.

22 **A.** Yes, the SAMI process.

23 **Q.** I'm wondering if you could describe for the Court
24 briefly your view about that as a consensus process.

25 **A.** Yeah. I guess "agonizing" is the first word I would

1 use. It was both its strength and its weakness in many ways.
2 Being a consensus process of states, federal agencies,
3 utilities, tourism, conservation organizations, the
4 likelihood that we would come to a consensus of action at the
5 end of the process was pretty slim.

6 On the strength side, I think, from my view, what was
7 really important about the process was the ongoing consensus
8 that had to happen at every step of the way. As we were
9 going through the examination of the material that was
10 presented to us, there was an opportunity at every step from
11 a consensus standpoint. Every fact, every data set, every
12 computer model, every assumption that went into every
13 computer model, at every point, all the participants had an
14 opportunity to say, I've got something better, you know, this
15 is not the best, so that, at each step, as we moved forward,
16 we were sure that everyone felt like that was the best
17 information moving into the integrated assessment which
18 produced the information that's in the SAMI document.

19 Q. And that included -- that consensus process included
20 your association organization?

21 A. Yes, it.

22 Q. And it included the State of North Carolina?

23 A. Yes, it did.

24 Q. And it included the Tennessee Valley Authority?

25 A. Yes, it did.

1 Q. From the perspective of the National Parks Conservation
2 Association, Mr. Barger, is the air in Tennessee and Kentucky
3 and North Carolina as free of pollution as it needs to be?

4 A. No, it's not. The National Park Service has -- I was
5 actually here in court on the first day of this trial, and
6 Mr. Jackson from the Forest Service talked about sulfate
7 deposition in the national forest. I can't remember which
8 one. But he said that, I remember it being kilograms per
9 hector per year, meaning relatively like pounds per acre per
10 year, and needed to be around 3 to 5. In Great Smoky
11 Mountains National Park, they're looking at about 4.5 --
12 between 4 and 5 as being what they call a target load and
13 where we really began to see recovery of the systems; and
14 nitrogen deposition in the park currently is at 33 kilograms
15 per hector per year, so that would be about an 85 percent
16 reduction in nitrogen deposition that would be needed.

17 So what that tells me is that we've really got a long
18 way to go.

19 MR. GULICK: Thank you. No further questions.

20 MS. COOPER: We have no questions, Your Honor.

21 THE COURT: All right. That will complete your
22 testimony, and you may be excused.

23 THE WITNESS: Thank you, Your Honor.

24 MR. GULICK: Thank you, Your Honor.

25 THE COURT: All right. I think this is a good

1 point to take our midmorning break. So we'll take a
2 15-minute break.

3 **(Recess.)**

4 **THE COURT:** All right. Call your next witness.

5 **MR. GULICK:** Your Honor, I forgot to move into
6 evidence the one new document, Exhibit 488, which is the
7 e-mail Mr. Barger testified about which I showed from the
8 projector.

9 **THE COURT:** All right. Let that be admitted. 488.

10 **(Plaintiff's Exhibit 488 received.)**

11 **MR. GOODSTEIN:** North Carolina's next witness, Your
12 Honor, is John Molenar.

13 **THE COURT:** All right.

14 **JOHN MOLENAR,**
15 **being duly sworn, was examined and testified as follows:**

16 **DIRECT EXAMINATION**

17 **MS. GOODSTEIN:** If I may approach, Your Honor. We
18 have a set of Mr. Molenar's exhibits for the Court.

19 **THE COURT:** All right, sir.

20 **BY MR. GOODSTEIN:**

21 **Q.** Good morning, Mr. Molenar. Can you state your full name
22 for the record, please?

23 **A.** John Victor Molenar.

24 **Q.** And how are you currently employed, Mr. Molenar?

25 **A.** I work for Air Resource Specialists, Inc., an

1 environmental consulting firm located in Fort Collins,
2 Colorado.

3 Q. What does Air Resource Specialists do?

4 A. We do all phases of atmospheric monitoring and modeling
5 for federal agencies, state agencies and private industry.

6 Q. And what are your responsibilities there?

7 A. I'm vice president of the company. My major
8 responsibilities are in the field of atmospheric visibility.
9 Primary responsibilities are in the form of research and
10 development for visibility and atmospheric optical
11 measurements, modeling, data interpretation.

12 Q. And how are you involved in this case?

13 A. I was hired by North Carolina Department of Justice to
14 review results of the Sonoma Technology modeling for
15 additional controls on TVA coal-fired power plants for
16 visibility effects.

17 Q. And were you asked to generate some images that show the
18 effects and improvements from the emissions reductions sought
19 by North Carolina in this case?

20 A. Yes. STI, in their report, used the software packages I
21 developed to generate imagery. North Carolina asked me to
22 generate images for other Class I areas in the region.

23 Q. And what is your area of expertise, Mr. Molenar?

24 A. I have a master's degree in atmospheric physics. My
25 major research field is in visibility and atmospheric optical

1 measurements.

2 Q. The first exhibit in your folder should be Plaintiff's
3 Exhibit 431 for identification. Will you take a look at
4 that, please.

5 Is this a copy of your CV?

6 A. Yes, it is.

7 Q. So your education is summarized on page 2 of Plaintiff's
8 Exhibit 431.

9 A. Yes.

10 Q. We offer 431 into evidence at this time, Your Honor.

11 THE COURT: Let it be admitted.

12 (Plaintiff's Exhibit 431 received.)

13 BY MR. GOODSTEIN:

14 Q. Can you describe for us, Mr. Molenar, a summary of your
15 educational experience, what you studied, and then summarize
16 your professional experience for us?

17 A. Yes. In 1973, when I went to school at Northern Arizona
18 University, I got involved in some of the early research in
19 visibility and atmospheric optical measurements.

20 When I graduated from there, I went to the University of
21 Reno (inaudible)...

22 Q. Can if you could slow down a little bit, Mr. Molenar?

23 A. University of Reno, Desert Research Institute, where I
24 got my master's degree in atmospheric physics.

25 After that, I was hired by the John Muir Institute,

1 which is a non-profit organization which funneled research
2 grants from university professors working in the field of
3 environmental sciences. In that capacity there, with the
4 Visibility Research Center in Las Vegas, Nevada, we conducted
5 the first perception studies for the National Park Service
6 and also began to develop a computer imaging code to
7 visualize air quality. In 1982, we moved to Fort Collins,
8 Colorado, the Visibility Research Center did.

9 I started my own business in 1983, Air Resource
10 Specialists, Inc., which we bid on a contract with the
11 National Park Service to do their optical imaging. Since
12 that time, we've expanded out do all the ambient air quality
13 ozone monitoring for the National Park Service. We also do
14 work for the U.S. Forest Service and other departments of
15 the federal government, the states of Colorado, Nevada,
16 Arizona and Wyoming. We also work with private industry, and
17 we do atmospheric modeling, monitoring, research data
18 interpretation.

19 We've also been involved in the Grand Canyon Visibility
20 Transport Commission, which was the first regional planning
21 organization which was formed in the mid 1990s, came up with
22 the first recommendations to EPA for the Regional Haze Rule.
23 I was personally involved on a number of the technical
24 committees and also a member of the Public Advisory
25 Committee, which is the committee that came to consensus on

1 their final report.

2 Since then, the regional planning organizations have
3 been formed in the United States. Those are groups of states
4 which have to address visibility impacts, and they've also
5 expanded that out to address other ambient air quality
6 impacts.

7 I, personally, and my company has, worked with all the
8 regional planning organizations: SAMI, VISTAS, RAP, the
9 Northeastern Regional Planning Organization, the Central
10 Regional Planning Organization, called CENRAP, and the
11 Midwest Region, called MRAP. I continued working with
12 National Park Service and had those contracts for 26 years.

13 I belong to a number of professional organizations: Air
14 and Waste Management Association; Society for Photographic --
15 can't remember -- excuse me -- the Society for Imaging
16 Science and Technology; International Society of Optical
17 Engineering.

18 **Q.** Can you describe for us, Mr. Molenar, the visibility
19 monitoring program that your firm and yourself operate for
20 the National Park Service?

21 **A.** Yes. The national program has got three phases. One of
22 them is called aerosol monitoring, which is operated by the
23 University of California-Davis. The other two are what we
24 call optical monitoring and C monitoring, or photographic
25 monitoring. My company runs and operates the optical

1 monitoring and C-monitoring programs for National Park
2 Service and U.S. Forest Service. That is a nationwide
3 program making measurements in national parks and wilderness
4 areas.

5 Q. Can you describe for us how those monitoring stations
6 work, what they're comprised of, and how they record
7 visibility effects?

8 A. Yes. The C-monitoring originally started with 35
9 millimeter cameras, which were phased out to digital cameras.
10 Those are scenic vistas areas and in a number of Class I
11 areas. Currently, there are over 100 cameras in operation.
12 That data, the old data, was on 35 millimeter slides that we
13 have and stored in archive, and we have over a million slides
14 from Class I areas across the United States.

15 We have digital cameras, which take pictures every 15
16 minutes. Those images are archived or uploaded to websites
17 for each of the areas that have one. National Park Service
18 operates 20 some and U.S. Forest Service operates about 50, I
19 think, and a number of the regional planning organizations
20 operate their own.

21 Q. And does your firm do the monitoring of visibility at
22 the Great Smoky Mountains National Park?

23 A. Yes, we do. We operate the Look Rock visibility site
24 for the National Park Service, Great Smoky Mountains.

25 The additional monitoring, besides the C-monitoring, is

1 the optical monitoring, and that is specialized
2 instrumentation that measures how clear the atmosphere is,
3 and measures what's called the scattering coefficient with an
4 instrument called nephelometer. And those operate in Class
5 I areas throughout the United States and also urban areas.

6 Q. And can you describe for us the database of photographs
7 that your firm maintains for the National Park Service and
8 other Federal Land Managers?

9 A. Yes. The original database began in early the 1980s
10 with 35-millimeter slides. Those were phased out
11 approximately 1998 to 2000 and we went to digital cameras.

12 The early slides have all been archived and stored in a
13 secure area in Fort Collins, Colorado. On those slides -- we
14 have examined all those slides and created what we call a
15 frequency distribution of visibility in Class I areas. Those
16 have been digitized and are available on the National Park
17 Service website. Also we've done that for the U.S. Forest
18 Service.

19 Since then, we've operated digital cameras which take
20 much more frequent images and are easier to archive and
21 store.

22 Q. And you can show the improvements to visibility that
23 will result at certain locations based on various air
24 dispersion model changes and emissions in the region?

25 A. Yes. For the last 25 years or so, we've been

1 developing -- I have been developing what we call visual air
2 quality simulation packages. The concept of visibility is
3 relatively complex and difficult to just present to lay
4 people and decision makers, all these numbers we talk about,
5 and so we decided to, since visibility is a visual
6 experience, to develop software packages that allow us to
7 visualize changes in air quality due to various changes and
8 concentrations of atmospheric aerosols and gases. And that's
9 what I used to generate the images which will be seen.

10 **Q.** Has this become a regular, generally accepted approach
11 to looking at changes in visual air quality resulting from
12 potential air pollution control programs?

13 **A.** Yes, it has. The full modeling package is quite complex
14 and difficult to use, so what was -- what I wrote and
15 developed in 1995 was a package called WinHaze. WinHaze is
16 an easy to use desktop application which synthesizes all
17 these various models and allows relatively untrained users to
18 generate imagery with inputs of various types of aerosols or
19 gases to see what the effect would be.

20 These packages have been developed under contracts with
21 the National Park Service, and we have used these packages
22 in -- well, all the regional planning organizations have used
23 this particular computer imaging model to generate imagery
24 for all their Class I areas under their advising and control.
25 Okay.

1 Q. Can you give us some examples of the regional planning
2 organizations that have used your WinHaze program to generate
3 images of visibility changes resulting from potential air
4 quality programs?

5 A. Yes. The Grand Canyon Visible Transport Commission
6 began this, but it really initiated with SAMI in the late
7 1990s. The SAMI report contains images of the Great Smoky
8 Mountains. VISTAS currently has on their website the
9 archived images created with WinHaze showing the baseline
10 2000 to 2004 air quality and the projected improvement in
11 2018. Those images are available for the public to download
12 and review. Those are created with WinHaze, specifically for
13 VISTAS.

14 Q. Has the methodology underlying WinHaze been peer
15 reviewed and published?

16 A. The basic algorithms have been published in two papers I
17 was an author with, and also about four or five other papers
18 where we researched and looked at basic algorithms and the
19 concept behind generating visual air quality using visual air
20 transfer models.

21 Q. Can you show us on your CV, on page two, where these
22 publications are that you are an author on that documented
23 the methodology underlying WinHaze? I think it might be --

24 A. Next page.

25 Q. Page three, I'm sorry. Page 3 of Plaintiff's Exhibit

1 431.

2 A. These publications here would be -- this one right here
3 was the first paper we published. We published another paper
4 in 1994, which is this one right here. Those are two papers
5 I've been an author on, with the photographic simulation
6 techniques.

7 There are other references, I believe, in my submitted
8 documents which have been published by Cal Tech, California
9 Institute of Technology, Los Alamos Laboratories, where we
10 originally developed these packages.

11 Q. Okay. And what are some of the projects that you worked
12 on in the field of atmospheric optics and visibility? Maybe
13 just give us a summary of the types of projects that you
14 worked on.

15 A. The major ones have been with the National Park Service
16 and the IMPROVE program. The IMPROVE program is the
17 inter-agency monitoring of protected visual environments. It
18 is a national program that monitors all Class I areas in the
19 United States. We are the optical monitoring contractor to
20 that program, and have been since IMPROVE started in 1988.

21 In addition to that, we have operated -- we operate the
22 State of the Wyoming's visibility monitoring network, the
23 State of Arizona's visibility monitoring network. We operate
24 now -- just recently, the State of Colorado has, through
25 their county system, implemented visibility monitoring

1 networks.

2 We also worked with the Electric Power Research
3 Institute, Shell Oil and EnCana Oil and Gas exploration on
4 their development of well and gas properties in western
5 United States.

6 Q. In addition to the several publications that we just
7 spoke about, do you have other publications in the field of
8 atmospheric physics, and are they listed in your CV?

9 A. Yes. There are several publications and reports and
10 presentations at conferences.

11 Q. What do you do to keep up in your field?

12 A. Well, I'm currently an active researcher in development
13 of the computer imaging software and maintaining that, and
14 data analysis interpretation. Work closely with the IMPROVE
15 program and all these other agencies we work with in
16 developing new monitoring technology and data interpretation
17 techniques.

18 MR. GOODSTEIN: At this point, Your Honor, we
19 tender Mr. Molenar as an expert in air pollution effects on
20 visibility.

21 THE COURT: Let the record show that the Court so
22 holds.

23 BY MR. GOODSTEIN:

24 Q. Mr. Molenar, have you authored a number of reports in
25 this matter, expert reports?

1 They should be at the back of your binder.

2 **A.** Yes, sir, I have. Yes.

3 **Q.** All right. So I want to direct your attention to
4 Plaintiff's Exhibit 472, 473, and 473A, and take a minute to
5 identify those and let us know if those are true and correct
6 copies of your expert disclosure reports in this case.

7 **A.** Yes, they are.

8 **MR. GOODSTEIN:** Your Honor, we offer 472, 473 and
9 473A into evidence.

10 **THE COURT:** Let those be admitted.

11 **(Plaintiff's Exhibits 472, 473 and 473A**
12 **received.)**

13 **BY MR. GOODSTEIN:**

14 **Q.** Mr. Molenar, so have you reached come conclusions on
15 improvements to visual air quality that would result from TVA
16 reducing their emissions as requested by North Carolina in
17 this case?

18 **A.** Yes, I have.

19 **Q.** And can you give us a summary of those conclusions,
20 please?

21 **A.** Yes. When I reviewed the results of STI's modeling and
22 the frequency of occurrence of changes in visibility and the
23 maximum changes modeled in each Class I one area, I concluded
24 that these were quite dramatic and quite significant
25 frequencies of occurrence in changes in visibility with those

1 additional controls.

2 Q. And you looked specifically at some of the Class I areas
3 in the region?

4 A. Yes. That would be Great Smoky Mountains, Shining Rock,
5 Linville Gorge, Joyce-Kilmer Slickrock, and also Shenandoah
6 National Park, which is a bit farther downwind.

7 Q. What are Class I areas?

8 A. Class I areas were mandated in the 1977 Clean Air Act
9 amendments. They are national parks greater than 5,000 acres
10 and U.S. wilderness areas greater than 6,000 acres, I
11 believe.

12 In 1977, there was 165 identified; 163 of them became
13 Class I areas. Two decided that they were not -- visibility
14 was not important. And those are mandatory.

15 Since then, tribes and states can designate additional
16 areas as Class I areas. Those areas receive the maximum
17 protection under the Clean Air Act, specifically to remedy
18 any existing visibility impairment and to maintain the very
19 good visibility on the cleanest days.

20 Q. Before we look at your results, Mr. Molenar, we wanted
21 to just get an overview of how regional haze and visibility
22 impairment occurs.

23 MR. GOODSTEIN: And with the Court's permission,
24 Your Honor, if I could have Mr. Molenar approach the easel.

25 Plaintiff's Exhibit 288 is on the easel. It should

1 also be in your book behind that number tab. And I think
2 that would help Mr. Molenar explain the basic processes of
3 visibility impairment.

4 **THE COURT:** You may step down.

5 **THE WITNESS:** Thank you.

6 **MR. GOODSTEIN:** Thank you, Your Honor.

7 **THE WITNESS:** Visibility is an interesting optical
8 phenomenon. Of all the atmospheric air pollution effects,
9 it's the one we are most intimate with as people living on
10 this planet.

11 Every morning when we wake up, we see various
12 vistas, and if we live in an area with multiple mountain
13 ridges, we can make instantaneous judgments about the air
14 quality. It's really the only air pollution indicator that
15 we have intimate knowledge of.

16 So when we sit up there -- what this schematic is
17 is a very simplified version of what we see when we're out
18 there. We're an observer standing somewhere, either at our
19 home or on a mountain looking out at a scenic vista, and if
20 we're lucky, we have a number of distant targets out there
21 that we can make judgments on.

22 What happens is air pollution, in the form of
23 gases, like SO₂, are emitted from industrial facilities and
24 coal-fired generating plants, or there are nitrogen oxides
25 emitted from automobiles, or we have organics emitted from

1 wildfires and other industrial processes. Those all get
2 transported downwind, and those gases convert into what we
3 call secondary aerosols.

4 Primary aerosols are also emitted from industrial
5 facilities and wind-blown dust. But in the eastern United
6 States, sulfates are the biggest contributor to our
7 visibility impairment.

8 As that mass of pollution gets transported, it ends
9 up impacting our scenic view. What we have out here is some
10 distant target that we're looking at that has color contrast,
11 various lighting characteristics. That image gets
12 transmitted through the atmosphere, and as it gets
13 transmitted through the atmosphere, that image-forming light
14 gets removed from the atmosphere by either being scattered
15 out, redirected in different directions, or absorbed by
16 absorbing particles. Absorbing particles are not a great
17 concern in the eastern United States. In the western United
18 States they are.

19 The other thing that happens is that the air
20 itself, between the observer and the target, is illuminated.
21 It gets illuminated by the sun; it gets illuminated by light
22 reflecting off the ground; it gets illuminated by light
23 interacting with clouds. And that interacts with these
24 aerosol particles and it gets redirected into your eye.
25 That's a veiling illumination we call path radiance.

1 I think the easiest way to explain that is if
2 you're driving at night and it's a fog, you put on your high
3 beams, you lose your visibility because that light gets
4 re-scattered into your eyes. And so visibility is just two
5 effects. It's a removal of light from a target and the light
6 scattered into your eyes by the atmosphere itself.

7 And what we do in visualization is we run
8 atmosphere radiated transfer models which follow the light
9 photons and generate the effects of the air pollution. It's
10 a very brief description.

11 Q. Thank you, Mr. Molenaar.

12 You have a figure in your report which is now marked
13 Plaintiff's Exhibit 289 for identification, and could you
14 identify that and explain to us what it shows?

15 A. Yes. This is a schematic of some of that process I was
16 discussing there.

17 SO₂ is emitted by combustion of fossil fuels that have
18 sulfur in them. Coal is the biggest contributor of sulfur
19 dioxide emissions. Sulfur dioxide is an invisible gas. When
20 it gets into the atmosphere, it reacts and converts into a
21 particle, usually an ammonium sulfate particle, and as the
22 particles grow, they get to a size they can interact with
23 light.

24 Sulfur dioxide also has an additional factor, and it's
25 called hygroscopic. It is hygroscopic. It has an affinity

1 for water. So water vapor below 100 percent humidity
2 condenses out of the atmosphere, becomes a liquid ammonium
3 particle, and that particle gets bigger and it has a larger
4 effect on the scattering of the visibility degradation. It
5 condensates -- condensation. This is unlike wind-blown dust
6 and most organics, which are not hydroscopic, so the water
7 vapor has no effect on them.

8 Q. Did you have a figure in your report that showed what
9 you just described?

10 A. Yes. The next exhibit.

11 Q. Okay. So referring you to Plaintiff's Exhibit 295 for
12 identification, should be the next one in the binder, can
13 you -- is this the figure from your report that you're
14 referring to?

15 A. Yes, it is.

16 Q. Can you explain to us what it shows, please?

17 A. Yes. This is a scene of Shining Rock Wilderness looking
18 at Mount Pisgah. I used the visual air quality simulation
19 techniques that we've developed to show the effects of the
20 same concentration of aerosol mass in the atmosphere. Three
21 of the scenes have sulfur ammonium sulfate and one scene has
22 fine soils, so the same amount -- if you were to measure the
23 amount of aerosols in the atmosphere, you'd get the same
24 number.

25 The upper right, or the A diagram, is 20 micrograms per

1 cubic meter of ammonia sulfate at 50 percent pH -- relative
2 humidity, excuse me -- and the visual range is 27 miles.

3 B is that same amount of ammonium sulfate, but relative
4 humidity goes to 75 percent instead of 50. The visual range
5 goes to 16 miles.

6 And the number C is the same amount of micrograms per
7 cubic meter of ammonium sulfate but at 95 percent relative
8 humidity -- which is probably close to this morning,
9 actually -- a visual range of about ten miles.

10 I must point out this is not fog. This is not fog.
11 This is water vapor in the atmosphere condensing out on
12 hygroscopic material. If instead of ammonium sulfate you had
13 a non-hygroscopic material, such as wind-blown dust, and you
14 had the same amount of mass -- and that's what you have in
15 image D -- this fine soil, at 95 percent humidity, has a
16 visual range of 81 miles.

17 This shows the exceptional effect of ammonium sulfate on
18 visibility degradation, which is one of the reasons it is
19 such an important issue in the United States, in fact, all of
20 the world.

21 Q. And what does this tell you about sulfur dioxide
22 emissions from power plants like the power plants run by TVA?

23 A. It is well known and well accepted that SO₂ emissions
24 are the greatest cause of visibility degradation in the
25 eastern United States, as has been stated by the SAMI reports

1 and VISTA reports, EPA reports, U.S. Forest Service and
2 National Park Service monitoring.

3 Q. And do you have a figure in your report that shows that?

4 A. Yes.

5 Q. I want to show you Plaintiff's Exhibit 294 for
6 identification. Is that a figure out of your report?

7 A. Yes, it is. I took it from a report by ABT Associates,
8 I believe, in 2000.

9 What this is is the source categories for SO2 from
10 electrical generation in the United States, where 88 percent
11 of the SO2 emitted in the United States comes from burning of
12 coal, with other minor electrical generating, oil, gas, and
13 other emitting the rest of the SO2, sulfur dioxide.

14 Q. And is this your understanding, in your experience?

15 A. Yes.

16 Q. And as part of your analysis, did you reconstruct
17 aerosol extinction at a number of Class I areas --

18 A. Yes.

19 Q. -- in the southeast region?

20 A. Yes, I did.

21 Q. I want to refer you to Plaintiff's Exhibit 290 for
22 identification. Can you explain to us -- I know you have
23 several of these figures. Can you explain to us what you did
24 to develop these figures and what they show?

25 A. Yes.

1 Q. So let's start with this one, this first one.

2 A. This data is taken directly from the IMPROVE database,
3 which is maintained by Colorado State University. It's
4 online.

5 What you do is, the IMPROVE program makes aerosol
6 measurements and speciates those measurements by chemical
7 analysis and then calculates the effective extinction for
8 each type of species, and then it stratifies those into the
9 whole year in various categories.

10 This particular category is the 20 percent worst days in
11 2004 at Shining Rock Wilderness Area. The 20 percent worst
12 days are an important category for visibility because they
13 are mentioned in the Regional Haze Rule as the days which
14 will be cleaned up to natural background by 2063.

15 So what they do is calculate the effect of extinction by
16 species, and then you sum up that total extinction and
17 visibility degradation and you apportion it. And this shows
18 by the measured data by the national IMPROVE program that
19 sulfates are responsible for over 80 percent of the
20 extinction of visibility degradation by aerosols in Shining
21 Rock, with the other constituents, sea salt, coarse mass,
22 which is wind-blown dust, fine soil, light absorbing carbon,
23 which is LAC, organics, which are various kinds of organic
24 emissions, and nitrates, which are ammonium nitrate, making
25 up the remainder.

1 Q. Okay. What does this tell you about the source of
2 visibility impairment at the Class I areas in this region?

3 Let's first start with Shining Rock.

4 A. Well, sulfates are the major dominant contributor for
5 visibility degradation, and sulfates come directly from SO2
6 emissions, and SO2 emissions are primarily from electrical
7 generating facilities, and that is primarily due to
8 coal-fired electrical generating facilities in the eastern
9 United States.

10 Q. Like the ones operated by TVA --

11 A. Yes.

12 Q. -- in Tennessee, Kentucky and Alabama?

13 A. Yes.

14 Q. Let's take a look at your second aerosol extinction
15 summary in Plaintiff's Exhibit 291 for identification. And
16 can you explain to us what you summarize here and what it
17 shows.

18 A. Yes. This is from Linville Gorge Wilderness Area. It
19 is, again, part of the national IMPROVE monitoring program.
20 This is the data for the 20 percent worst visibility days of
21 2004. And this shows that sulfates are over 85 percent of
22 the aerosol extinction on the worst days.

23 Q. And have you had an opportunity to look at this data
24 since 2004?

25 A. Yes. The 2005 data and 2006 data are out. They weren't

1 as easily accessible in these kind of pie charts, but it is
2 the same similar thing, over 85 percent -- 80 to 85 percent
3 of sulfates on the worst days.

4 **Q.** Let's look at Plaintiff's Exhibit 292 for
5 identification. And can you explain to us what this shows?

6 **A.** Similar plot. This is done for Great Smoky Mountains
7 National Park in Tennessee. Again, over 85 percent is due to
8 sulfate on the 20 percent worst days due to extinction.

9 **Q.** And so what does this tell you about visibility
10 impairment in the Great Smoky Mountains National Park in
11 Tennessee?

12 **A.** Similar picture as we've seen with Linville Gorge and
13 Shining Rock, the whole Appalachian region is affected
14 primarily by sulfate, ammonium sulfate in the atmosphere
15 causing the vast majority of visibility degradation on the
16 worst days.

17 **Q.** Let's take a look at Plaintiff's Exhibit 293 for
18 identification.

19 **MS. GILLEN:** Your Honor, TVA would object to
20 Exhibit 293 based on Your Honor's previous ruling about
21 impacts in states like Virginia, where Shenandoah National
22 Park is located.

23 **THE COURT:** All right. Overruled.

24 **MR. GOODSTEIN:** Thank you, Your Honor.

25

1 BY MR. GOODSTEIN:

2 Q. Can you explain to us, Mr. Molenar, what this one shows?

3 A. Yes. This is data similar to the IMPROVE monitoring
4 program at Shenandoah National Park. It shows that the
5 sulfate, again, ammonium sulfate, again, is the primary cause
6 of aerosol extinction, primary cause of visibility
7 degradation in a wide region in the eastern United States.

8 Q. And does this data from Shenandoah National Park confirm
9 the traceability of the sources of visibility impairment that
10 you've seen at the other Class I areas that you've shown us
11 in the last few figures? Is it the same type of
12 relationships between sulfates and visibility impairment?

13 A. Yes. Sulfates are the primary cause of visibility
14 impairment in the eastern United States due to SO2 emissions.

15 Q. All right. Mr. Molenar, we have a series of summary
16 tables that were contained in your report and generated by
17 STI. And we don't have to go through these results in
18 detail, but I just want you to identify them for the record
19 as data that you considered and relied on in reaching your
20 conclusions.

21 So maybe you could just look at each one and explain to
22 us how you considered them and relied on them in reaching
23 your conclusions.

24 So let's start with Plaintiff's Exhibit 162.

25 A. Yes. This is data directly from the STI report. This

1 is their model improvement of the 20 percent worst days in
2 2013 with additional controls. And they define it as
3 perceptible visibility improvement, which is defined as a
4 one-deciview change.

5 Q. Can you tell us what a one-deciview change means?

6 A. Yes. The perception of visibility degradation is not a
7 linear extinction in the amount of aerosols that are put in
8 the atmosphere. So the deciview metric was developed to try
9 to linearize changes in extinction to a perceptible
10 increment.

11 The best example of this I could give you would be if
12 you have a very highly polluted day, and we have 100 units of
13 extinction, and we change that by two, that would be a two
14 percent change, it would probably be imperceptible. However,
15 on a very clean day, we only had 12 units of distinction and
16 we changed it by 2, that would be almost a 20 percent change
17 in extinction, which would be highly perceptible.

18 The same amount of change of aerosol in the atmosphere
19 has a greater effect on cleaner days than on hazy days. That
20 was the concept of deciviews. It's a way of creating a
21 metric which is linear with perceptibility.

22 So the determination has been that approximately a
23 10 percent change in extinction, which is one deciview, is a
24 perceptible increment.

25 Q. And has a one-deciview change been generally accepted as

1 the change that would result in a perceptible visibility
2 improvement by the population?

3 A. There has been a lot of research and discussion on
4 deciview changes. The concept behind this was developed out
5 of studies started in the late 1970s all through the mid '80s
6 run by National Park Service, trying to determine how people
7 perceive changes in air quality.

8 Those studies surveyed over 2000 people in three
9 national parks using projected images, people looking outside
10 their windows, making measurements of the scene, and it was
11 determined that approximately a 10 percent change in
12 extinction is perceptible to these visitors in the parks.

13 Over a series of years, that was turned into this
14 concept of deciview. It was put into the Clean Air Regional
15 Haze Rule in 1999, where the EPA stated that a one-deciview
16 change was perceptible. It was used -- it is used by what's
17 called FLAG, which is Federal Land Managers Air Quality
18 Group. It is a group that has developed models to look at
19 siting of new facilities near Class I areas. They have
20 determined -- and they use a half a deciview -- or excuse
21 me -- a half a deciview or a 5 percent change in extinction,
22 as a cause for concern, where they would look up the
23 emissions from a particular plant and say, what can we do to
24 improve it. They use one deciview as a definite flag that
25 they would question the permitting of that facility.

1 The EPA has reiterated this concept in the 2005 BART,
2 Best Available Retrofit Technology, final ruling in 2005,
3 where they stated that, again, a half a deciview contributes
4 to visibility degradation and one deciview causes visibility
5 degradation when emissions come from any particular facility.

6 **Q.** Mr. Molenar, as an expert in impacts of air pollution on
7 visibility, based on your experience, how would you
8 describe -- how would you characterize these visibility
9 changes that you have data regarding for improvements in air
10 quality, visual air quality, resulting from additional
11 emissions reductions sought by North Carolina from TVA plants
12 in this case?

13 **A.** When I first saw these, when they were first submitted
14 to me, I was actually quite stunned that they were this
15 large. The national goal is to, over a 60-year period, to
16 clean up the haziest days in this country.

17 Having worked with the regional planning organizations
18 and looked at other facilities all throughout the United
19 States, to see additional controls resulting in 18 to 20 days
20 of perceptible improvement on the 20 percent haziest days was
21 quite a large number. So I was quite amazed, actually.

22 **Q.** And did you take a look at this data in terms of
23 deciview changes as well?

24 **A.** Yes.

25 **Q.** And you have a table in your report to show that.

1 A. Yes.

2 Q. And that is Plaintiff's Exhibit 302 for identification?

3 A. Yes. What this is was the maximum change model for
4 2002 by STI with additional controls. Each specific day is
5 noted from the base 2013, and if you had additional controls
6 on the TVA, their model predicts up to a seven-deciview
7 change in Shining Rock and a two-deciview change at a Class I
8 as far as away as Shenandoah National Park. These are the
9 maximum changes. These are also the changes that I used to
10 generate images from.

11 Q. Based on your experience, would you expect similar types
12 of improvement at other Class I areas around the region?

13 A. You would expect improvements at other Class I areas,
14 the nearest Class I areas, which would be areas like Mammoth
15 Cave National Park, which is already highly improved, and, in
16 fact, had the worst visibility air quality of all national
17 park facilities that we monitor.

18 You would also expect improvement in areas outside these
19 Class I regions that are contiguous to that area.

20 Q. And what do these changes in deciviews that you have
21 estimated resulting from the additional emissions reductions
22 sought by North Carolina of TVA in this case -- how would you
23 describe, based on your experience, these deciview changes?

24 A. The maximum deciview changes are quite large. These are
25 from four to seven in the nearby Class I areas. That is a 40

1 to 70 percent change in extinction.

2 Q. And how would you describe the frequency of these
3 improvements based on the number of days?

4 A. On the haziest days, we're talking about approximately a
5 one-in-four to one-in-three day improvement, which is 25 to
6 30 percent of the time there would be perceptible change in
7 the worst days in the Class I areas. I believe there is
8 another table that talks about the changes all year round,
9 not just on the worst days. There are perceptible changes on
10 days other than the 20 percent worst days, too.

11 Q. Okay. And is that Plaintiff's Exhibit 161 for
12 identification?

13 A. Yes.

14 Q. And so can you explain to us what you concluded from
15 these results based on your experience as an air quality
16 atmospheric physics expert?

17 A. Having 40 days a year perceptible change in visibility
18 due to any kind of emission controls is a significant event.
19 I've been involved with analyses and source apportionment for
20 a number of studies on power plants, throughout the western
21 United States, specifically, and many times in some of these
22 studies we've seen very little improvement with anticipated
23 controls. With this particular control strategy on the TVA
24 plants to get 40 days a year -- 40 plus days a year over such
25 a wide region is significant.

1 Q. And referring your attention to Plaintiff's Exhibit 160
2 for identification, can you explain the significance of these
3 results in your conclusions?

4 A. Oh, yeah. We can you use the term "deciview" to do
5 perceptible changes. However, for most people, the concept
6 of visual range, how far you can see, is a little bit more
7 intuitive. And so this data comes again from the STI report,
8 and it talks about the change in visual range, or how far you
9 could see a large dark objects with these kind of
10 improvements. So you see changes in visual range anywhere
11 from 20 to 100 percent, doubling the visual range at Shining
12 Rock on the maximum improved days.

13 MR. GOODSTEIN: Your Honor, we'd like to offer the
14 exhibits we've covered so far with Mr. Molenar into evidence,
15 and I believe they're Plaintiff's Exhibit 288, 289, 295, 294,
16 290, 291, 292, 293, and 302. We offer these into evidence at
17 this time.

18 THE COURT: All right. Let those be admitted.

19 MR. GOODSTEIN: Thank you, Your Honor.

20 (Plaintiff's Exhibits 288 through 295, and 302
21 received.)

22 MR. GOODSTEIN: Thank you, Your Honor.

23 BY MR. GOODSTEIN:

24 Q. What is the significance of visible range? Can you
25 describe that for us, Mr. Molenar?

1 A. Oh, yeah. Visible range actually has a well-defined
2 meaning in terms of meteorologic or air quality visibility.
3 It's how far you can see a large black target on the horizon.
4 And if you assume that if you have a two percent contrast or
5 that target makes it two percent darker than the background,
6 you would detect that target.

7 In the eastern United States, visual range has real good
8 physical meaning because you have enough targets out there
9 which are beyond the visual range, so that if you change
10 visual range from 10 miles to 20 miles, you'll see a new
11 mountain that will just all of a sudden appear.

12 In the western United States, visible range has a little
13 bit less meaning because the visual range is something a
14 little over 150 miles, and there is nothing that far away
15 that you can see.

16 Q. So based on your experience, these visual range
17 improvements that we just went over that will result from
18 these emissions reductions at TVA plants sought by North
19 Carolina, what do you conclude about those changes in visual
20 range?

21 A. Well, the maximum cleanup days, if you went from 10-mile
22 visual range to 20-mile visual range, all the mountains that
23 were between the 10 to 20 would be visible. Those particular
24 targets would now be visible to the observer.

25 As was discussed earlier today, sometimes Mount Pisgah

1 cannot be seen from the Biltmore Estate. Mount Pisgah, I
2 believe they said, is 17 miles away. So if the visual range
3 is 10 miles, you can't see Mount Pisgah. If the visual range
4 is 20 miles, you can see Mount Pisgah. That's the kind of
5 effect it has.

6 Q. Mr. Molenaar, were you involved in the SAMI process?

7 A. Yes. We provided support for data analysis
8 interpretation. We developed some software products for them
9 to generate graphs and data analysis for the final SAMI
10 report, yes.

11 Q. Were these relationships that you just described for us
12 between sulfur dioxide emissions from coal-fired power plants
13 like TVA's and visibility impairment known to the
14 participants in the SAMI process?

15 A. Yes.

16 Q. And based on your experience, how many -- approximately
17 how many years has that been common knowledge in your field,
18 that relationship?

19 A. Since I started in the field in early 1970s, it was
20 known that sulfates were the primary cause of visibility
21 degradation in the eastern United States.

22 It has been studied, verified, restudied, looked at,
23 source apportioned. The dominant cause of visibility in
24 eastern United States is sulfate pollution.

25 Q. And do you know whether TVA participated in SAMI?

1 A. Yes, they were a participant.

2 Q. Turn your attention, Mr. Molenaar, to Plaintiff's Exhibit
3 303 for identification. And it should be a figure out of one
4 of your supplemental reports. Can you identify it?

5 A. Yes. Excuse me. The yellow squares are the Class I
6 areas modeled by STI. These are separate areas: Look Rock,
7 Great Smoky Mountains, Joyce-Kilmer Slickrock, Shining Rock,
8 and Linville Gorge Wilderness Areas, those areas where
9 specific improvements were modeled.

10 Since regional haze is a regional issue, the haze does
11 not end at the boundaries of Class I areas, what I did was
12 made a calculated estimate of days in North Carolina, which
13 is the red shaded areas, that would also experience 40 or
14 more days of perceptible improvement with additional
15 controls. This region would extend into Tennessee and into
16 surrounding other states, but on this particular graphic, I
17 only focused on North Carolina. So the areas in between
18 these class ones areas would also have similar improvements
19 in visibility.

20 Q. All right. And you mentioned that you stopped the
21 shading on this particular figure at the border, but would
22 you expect similar improvements to visual air quality with
23 the emissions reductions sought by North Carolina extending
24 into the state of Tennessee?

25 A. Yes.

1 Q. And you also have some points of interest indicated in
2 blue circles.

3 A. Blue circles are current state parks in North Carolina,
4 which, even though they do not have Class I protection status
5 from the federal government, are areas of recreation. I
6 think we had some testimony from Chimney Rock -- the ex-owner
7 of Chimney Rock that visibility is very important at his
8 particular facility, and it would be in this area that would
9 experience 40 or more days of improved visibility --
10 perceptible improved visibility.

11 Q. And this area includes Mount Mitchell?

12 A. Mount Mitchell, yes.

13 Q. And it includes Gorges State Park?

14 A. It would be, yes.

15 Gorges? Is that how you pronounce it? Yes.

16 Q. As well as the Class I receptor areas that you
17 identified for us?

18 A. Yes.

19 Q. And you would expect it to extend to the Look Rock area
20 as well, in Tennessee?

21 A. Yes. Look Rock was one of the model receptor sites that
22 had 40 plus days of perceptible improvement. So they would
23 extend around that region to some extent and there would be
24 similar improvements.

25 Q. And this would include the Asheville area?

1 A. Yes. Definitely.

2 MR. GOODSTEIN: Your Honor, we offer Plaintiff's
3 303 into evidence.

4 THE COURT: Let it be admitted.

5 (Plaintiff's Exhibit 303 received.).

6 BY MR. GOODSTEIN:

7 Q. Mr. Molenar, we want to move into your results using the
8 WinHaze model. And maybe you could just give us a little
9 overview into how you prepared these photo simulations and
10 explain to us what they show as we move through the series.

11 A. Sure. I'll give you first a brief overview of the
12 modeling process.

13 Unlike Hollywood, we do not recreate the scene from
14 scratch. We have searched the photographic database from the
15 various national visibility monitoring programs to find the
16 cleanest slide we could find for all the Class I areas.

17 As was mentioned earlier, even the most hazed out parts
18 of the United States get clean. A few years ago when the
19 hurricanes came through, I happened to have been in the area
20 at the same time, and visibility was dramatically improved.

21 So for every Class I area in the United States where
22 we've had cameras, we have a base image of a very, very clean
23 day, very near Rayleigh conditions. Rayleigh means no
24 atmospheric aerosol. That becomes the base image from which
25 we generate all of our images. That image is digitized,

1 turned into an electronic file, and calibrated to generate a
2 base radiance field, which we then use in radiative transfer
3 models to model the effects, as on this diagram up here, to
4 generate a new image under different atmospheric aerosol
5 loadings, air pollution loadings.

6 From that, then, you could model a base image at some
7 particular level of aerosols in the atmosphere, change that
8 level of aerosols in the atmosphere, and visualize the
9 improvement with an image, not just a number like two
10 deciviews or five deciviews or a 10-mile visual range.

11 Visibility is not just how far you can see; it's how
12 well you can see. It's color contrast, detail of the scene,
13 and it's all the sharpness that you pick out on cleaner days.

14 Q. So you used -- as your base photographs for the
15 simulations you did in this case, you used photographs from
16 the database that you maintain for the National Park Service?

17 A. And the Forest Service, yes.

18 Q. And Forest Service.

19 A. Yes. The cleanest images have been put into WinHaze as
20 base images for anybody's use.

21 Q. And then you also used the CMAQ air quality modeling
22 output that you obtained from Sonoma Technologies?

23 A. Yes. The WinHaze model, what you input into it is
24 aerosol concentrations or extinction. You generate that with
25 other modeling exercises.

1 And so what I took was the base images modeled by Sonoma
2 Technologies, the base aerosol extinction, and their improved
3 aerosol extinction on the worst days, and created images for
4 the 2013 base image and then 2013 with additional controls.

5 Q. Let's go -- let's take a look at Plaintiff's Exhibit 296
6 for identification. And each of these exhibits coming up
7 contain a series of photographs.

8 Can you explain to us for this one what each photograph
9 in the series from Plaintiff's Exhibit 296 for identification
10 shows?

11 A. Yes. This is a view of the Shining Rock Wilderness
12 toward Mount Pisgah. This is the 2013 base image without
13 controls on the TVA power plants with 22.5-mile visual range.
14 I'd have to look back to find the exact deciview, though. I
15 can't remember off the top of my head.

16 Then the next image, B, is that same scene modeled with
17 additional controls on the TVA coal-fired power plants with a
18 visual range of 45.6 miles.

19 If we flip back and forth between those two images, you
20 can see the improvements, projected improvements modeled.
21 And what you see is the far distant horizon becomes much more
22 distinct, the sky becomes bluer, and the foreground images
23 become less murky, less hazed out, which is what you see when
24 you improve visibility. It's not just how far you can see;
25 it's how well you can see details of nearby features which

1 are closer than the visual range.

2 Q. What you see on your screen right now, Mr. Molenar, are
3 those two photos side by side?

4 A. Those are two photos side by side, yes.

5 Q. The one on the right is the one with the emissions
6 reductions sought by North Carolina on TVA plants?

7 A. Yes.

8 Q. And what do you see -- based on your experience, what do
9 you see is the difference?

10 A. These are the kinds of improvements that -- this is the
11 goal of the Regional Haze Rule. These are the kind of
12 improvements that are dramatic and significant to anybody who
13 visits a visitor center or visibility site in Class I areas.

14 Again, we've heard earlier testimony today about the
15 importance of visibility to visitors to national parks,
16 wilderness areas, state parks, and facilities such as the
17 Biltmore Estate. It is the primary reason that -- one of the
18 primary reasons people go to these remote areas, is to have
19 clear air.

20 Q. Can you see an additional mountain range in the figure
21 on the right?

22 A. The farthest mountain range is very indistinct on the
23 22.5-mile visual range and is quite distinct on the 45-mile
24 visual range. That's because that mountain range is right
25 near the visual range, and so, depending on your visual

1 acuity, it will either not be there or, if you clean it up,
2 it will be there.

3 Q. And what is the improvement in visual range that you
4 estimated on this series at the Mount Pisgah vista?

5 A. It was at 12.1 -- excuse me. 22.1. It's almost
6 doubled.

7 Q. So it goes from 22.5 miles to 45.6 miles?

8 A. To 45.6 miles, yes.

9 Q. Moving on to 296C.

10 MR. GOODSTEIN: These are labeled in the upper
11 left-hand corner, Your Honor, if that's helpful.

12 THE COURT: All right.

13 BY MR. GOODSTEIN:

14 Q. What does this simulation show, Mr. Molenar?

15 A. What it is is WinHaze has the ability to split images.
16 You can actually create two images and then take your split
17 and put it wherever you want on the scene.

18 What you have here is the base case, no control on the
19 left, 22.5-mile visual range, and the model improvement with
20 controls on the TVA coal-fired power plants. These kind of
21 images, these are similar to the images which VISTAS has
22 created and are on their website, where they've looked at the
23 base 2018 -- excuse me -- the base 20 percent worst days in
24 2000 and 2004 and their projected improvements in 2018 for
25 meeting regional haze goals.

1 Q. So the improvement is on the right, with the additional
2 controls on TVA power plants.

3 And what about the next one, 296?

4 A. 296 is just the reverse, so that you have the base case,
5 no controls on the right, the case where you have additional
6 controls on the left.

7 Q. And how would you describe the differences based on your
8 experience? What do you see here?

9 A. Again, what you see is the far distant mountain range
10 becomes much more distinct. The sky color itself becomes
11 bluer as you decrease the amount of pollution in the
12 atmosphere. That is one of the not discussed -- it's not
13 discussed on a regulatory case about the color of the sky,
14 but it is one of the benefits when you reduce air pollution,
15 is that the sky becomes bluer. Only to the horizon does it
16 become that murky white. The details on the nearby features
17 are also sharper. You start seeing detailed color contrast
18 on those features which are closer to visual range, but not
19 just murred out by an opaque veil. You see the trees and the
20 shadows.

21 That's what happens when you reduce air pollution, in
22 terms of visibility.

23 Q. Let's go on to the next series you prepared,
24 Mr. Molenar. This should be Plaintiff's Exhibit 297 for
25 identification.

1 A. This is another view at Shining Rock. A number of the
2 Class I areas have multiple cameras. This particular one
3 operated by the Forest Service has two cameras. This is a
4 view towards Cold Mountain from Shining Rock. This is the
5 base case, with 22.5-mile visibility without controls.

6 Q. Mr. Molenaar, could you do us a favor and clear your
7 screen. If you'd press "Clear All."

8 Thank you very much.

9 And is this a similar series for this Cold Mountain
10 vista in North Carolina?

11 A. Yes. It's the same as with the other previous, Shining
12 Rock vista.

13 Q. So can you please take us through this series and
14 explain what it shows.

15 A. Again, this is the day that will show the greatest
16 improvement from STI modeling. This is their base case
17 without additional controls, 22.5 miles. This is the Cold
18 Mountain vista.

19 The next image, B, would be the improvement to
20 45.6 miles, with additional controls on the TVA coal-fired
21 power plants, their model improvement.

22 The next one would be the split image, with the base
23 case on the left, the improvement on the right. And the
24 final one would be a split image, with the base case on the
25 right and the model improvement on the left.

1 Q. How would you describe what these show, based on your
2 experience?

3 A. Again, similar improvements as with the other image.
4 Sky gets bluer; horizon lines get sharper; detail on the
5 foreground becomes more distinct; shadows become darker.
6 They're not so light because of the path radiance by the
7 scattered radiation from the aerosols in the atmosphere.

8 Q. Let's take a look at Plaintiff's 298 for identification.
9 Can you explain to us what this series shows?

10 A. Similar to the previous ones, this is, again, the model
11 of the worst day and model of the day with the greatest
12 improvement. This is Linville Gorge Wilderness, again, the
13 camera operated by the U.S. Forest Service.

14 This is their base case day, 19.7-mile visual range.
15 The next slide shows the improvement with additional
16 controls, 34.2 miles visual range. This is a case where on
17 the base case the far distant horizon is very, very close to
18 the visual range so it's very indistinct and very whited out.
19 The improvement, then, you don't have as many nearby features
20 to the extent it's a distant panorama.

21 The next two images are the split images again, with the
22 no control scenario on the left, additional control scenario
23 on the right. The final one is no control scenario on the
24 right, additional controls on the coal-fired power plants on
25 the left.

1 Again, sky gets bluer; distant terrain features become
2 sharper; intermediate terrain features lose the milky-white
3 haze; close in features, shadows become darker, contrast
4 improves.

5 Q. How would you describe the changes in the visible range
6 of the showing on this simulation for Linville Gorge with the
7 additional controls on TVA's coal-fired power plants?

8 A. Well, almost 15-mile change in visible range. That's
9 70 percent range. Not quite as big as Shining Rock, but
10 they're still very, very large.

11 Q. And let's look at Plaintiff's Exhibit 300 for
12 identification. Can you explain to us what that series
13 shows?

14 A. Yes. This is actually a very old image of the Great
15 Smoky Mountains. This is one of the first images put in
16 WinHaze. This is the worst case model -- day of most
17 improvements, the base case of no controls of 15.5 miles
18 visual range.

19 The next image is the image with the additional controls
20 on TVA's coal-fired power plants. The visual range increases
21 from 15.5 to 26.2. Again, what you have is a change in --
22 the next one then is the no controls on the left, controls on
23 the right. And the final one is just swapped; no controls on
24 the right, controls on the left.

25 Again, similar changes. Sky color changes; horizon gets

1 bluer as you go higher up in the sky. The horizon itself
2 isn't as white. The distant terrain features are darker,
3 more contrast. The close terrain features, the shadows
4 become darker. Overall visibility is great improvement.

5 Q. This is a view from Great Smoky Mountains National Park
6 in Tennessee; is that right?

7 A. Yes, it is.

8 Q. And would you expect similar types of improvements to
9 occur in that area around this particular viewpoint?

10 A. Oh, yes. Yes. This is just one -- how can I say this?
11 There's not enough money to put out cameras to look at all
12 the different visibility places in all the national parks and
13 wilderness areas. So when the camera systems were first
14 installed, typically, they went to an overview that people
15 went to and tried to pick something that was significant for
16 the park.

17 But you could go to any of these Class I areas and find
18 similar views with different kind of distant features that
19 you could see from hiking trails even more dramatic, but it's
20 just harder to keep your equipment there.

21 And the next -- the next picture will show a problem
22 with that.

23 Q. Okay. So based -- one more question on this one. Based
24 on your experience, you would expect to see similar types of
25 improvements along the mountains in the Tennessee side of the

1 Smokies as you've modeled on Plaintiff's Exhibit 300D.

2 A. Yes.

3 Q. All right. Now let's go on to Plaintiff's Exhibit 301
4 for identification. And can you explain --

5 A. Yes. This is a view in Shenandoah National Park.
6 Actually, this is one of the prettier views in the park.
7 It's called Dicky's Ridge. It is an area where we had a
8 camera for only six months because it got vandalized twice,
9 so we could never do it anymore.

10 Luckily, we happened to have a camera there one fall
11 when a very clear cold front came through so we could get a
12 base image. This has some long, long range views out there.
13 This is the day with the most improvement. This would be the
14 base case with no controls on the TVA plants, 24.9 miles.

15 Then the next image would be with controls on TVA
16 plants. Now, this site has a smaller change in visual range
17 and maximum change in visibility. It is also, I believe, a
18 couple, 200 miles plus downwind from the power plants, which
19 shows that improvements, not as dramatic as at the nearby
20 Class I areas, still occur over a wide range over the region,
21 as far out as Shenandoah National Park.

22 Q. What does this tell you about the current impacts of
23 emissions from TVA coal-fired power plants on visual air
24 quality in the region?

25 A. It's a regional issue. Regional haze is a large mass of

1 polluted air which is impacted by all emissions in that area.
2 But emissions from any industrial facility can have
3 long-range effects downwind, up to 2 to 300 miles downwind.

4 Q. And with the additional emissions reductions sought by
5 North Carolina in this case, would you expect to see
6 improvements in visual air quality in North Carolina?

7 A. Yes. North Carolina, Tennessee, farther out downwind, I
8 would expect to see those, yes.

9 Q. How about Kentucky and Alabama?

10 A. When the wind blew in that direction, yes. When
11 emissions from the plants were transported into those
12 regions, you would see improvement if their emissions were
13 reduced.

14 Q. So if the sulfur dioxide emissions from TVA power plants
15 and the resulting sulfates were blowing in the directions of
16 areas in each of the states where the plants are located, you
17 would expect to see similar types of visual air quality
18 impairment as we've seen in your simulations?

19 A. Yes.

20 Q. So the reduction in sulfur dioxide emissions sought by
21 North Carolina of TVA in this case is going to have a
22 positive effect on visual air quality in the states where
23 TVA's plant are located?

24 A. I would expect that, yes.

25 Q. As well as North Carolina and other states in the

1 region?

2 A. Yes.

3 MR. GOODSTEIN: Your Honor, we offer 296, 297 and
4 298, 300 and 301 into evidence.

5 THE COURT: Let those be admitted.

6 (Plaintiff's Exhibits 296, 297, 298, 300 and 301
7 received.)

8 BY MR. GOODSTEIN:

9 Q. So, Mr. Molenar, in summary, what did you conclude about
10 the improvements in visual air quality that will result if
11 TVA were to reduce its emissions as requested by North
12 Carolina in this case?

13 A. Reviewing the results of STI's modeling and creating
14 these images, and using my experience in the field, the
15 maximum improvements are quite dramatic and the frequency
16 occurrence of perceptible changes in visual air quality would
17 be significant throughout the region.

18 Q. And that includes the states where TVA's plants are
19 located.

20 A. Yes. Besides the receptors -- I believe, besides the
21 receptor's model, there would be a wide region experiencing
22 perceptible improvement in visibility on significant number
23 of days.

24 Q. And that includes North Carolina?

25 A. That includes North Carolina, yes.

1 Q. Now, have you had an opportunity to review the expert
2 disclosure report submitted by Dr. Ivar Tombach on behalf of
3 TVA?

4 A. Yes.

5 Q. And do you recall Dr. Tombach's comments on your use of
6 a one-deciview change as an appropriate unit for perceivable
7 improvement in visual air quality?

8 A. Yes.

9 Q. Did those comments cause you to change your conclusions?

10 A. No. I've seen Dr. Tombach's comments before. I've
11 worked with Dr. Ron Henry, who did much of the work that
12 Dr. Tombach's comments were based on, in the past. I have
13 had discussions with both of them on this.

14 My position still is that a one-deciview change is
15 perceptible to a significant portion of the population. It
16 has also been EPA's position and the Federal Land
17 Management's position that that is the case.

18 Q. And can you tell us the process that Federal Land
19 Managers went through to adopt the one-deciview change as
20 their measure of perceivable improvement? Can you just
21 summarize for us the process?

22 A. Yes. When the Clean Air Act was amended in 1977 and
23 made visibility a national goal, there was no real knowledge
24 of how people perceived visibility. How do people actually
25 experience changes in air quality when you're looking out in

1 the field?

2 National Park Service initiated, in 1979, a perception
3 study at Canyonlands National Park. It was based on work
4 done by a number of psychophysicists, actually, for the
5 American Petroleum Institute, looking at scenic beauty in
6 national parks and wilderness areas.

7 We presented to observers a series of slides with
8 changing visibility and had them rate those slides. From
9 those slides, we made measurements of what the people were
10 actually seeing with an instrument called a radiometer of the
11 stimulus on the scene.

12 Besides looking at those particular images, they also
13 then looked outside at the same scene, frame by window frame,
14 and made judgments of a three-dimensional scene, which we
15 took pictures of and then funneled back into this survey.

16 At Canyonlands National Park, we had over 700 people we
17 surveyed and we tried to determine how people rate changes in
18 visibility and what measurement we could make to tie those
19 ratings to, and those measurements basically used a
20 measurement called contrast, how dark this mountain was
21 against the sky. We looked at confounding effects of clouds,
22 time of day, snow on the mountains, all these different
23 issues, which confound a person's judgment of visibility.

24 What was interesting was all those confounding effects
25 changed the perceived scenic beauty but not the perceived

1 visibility. If you held the time of day constant or you hold
2 the clouds constant or you held snow on the mountain constant
3 and changed the air quality, they rated changes in air
4 quality the same. The rating scale was a one-to-ten
5 judgment. So a scene with lots of snow and clouds might
6 start out as a base rating of eight and go down to a base
7 rating of four as your change in air quality got worse. A
8 scene without clouds might start at a base rate of five and
9 go down to one, but the rate of change with air quality was
10 the same. We were pretty amazed at that.

11 We continued the studies in 1980 in Mesa Verde National
12 Park and Grand Canyon National Park, where we used, again,
13 similar projected slides, on-site scenes. We also
14 incorporated photographic prints, incorporated split screens,
15 incorporated multiple different ways of testing human
16 response.

17 After that, we then spent two or three years in a
18 laboratory, where we were generating computer images, looking
19 at various changes in air quality generated by computer
20 imaging. We also looked at plumes, looked at hazes. We
21 actually also worked with the Department of Defense on
22 detectability of plumes from jet aircraft for pilots. This
23 was a period from 1979 to about 1986.

24 A number of studies were done. A few thousand people
25 were interviewed. Those coalesced around this concept of a

1 10 percent change in extinction being detectable to most
2 people when the scenic vista that you were looking at had a
3 sensitive scenic element.

4 It turned out that when people look out at a scene, if
5 they know the scene reasonably well, they've been trained or
6 they lived there or go there regularly, they key in on these
7 specific scenic elements which have the maximum rate of
8 change in air quality, and so they can accurately and
9 reliably deduce changes in air quality. That idea of a
10 10 percent change in extinction in view was not a linear
11 aerosol concentration, so the concept then was to linearize
12 it with this term called deciview, which is similar to the
13 way you linearize sounds per decibels. So that one-decibel
14 change is perceptible for sounds; a one-deciview change is
15 perceptible in visibility. It does not mean 100 percent of
16 the people will detect that change; it means a significant
17 probability that people will detect that change.

18 We've actually -- there are people that have argued,
19 researchers, that a half a deciview or a 5 percent change is
20 detectable by a significant fraction of the sensitive people
21 in the population. So that's why a half a deciview is
22 considered a low concern when a new facility is being
23 permitted that it might cause -- it contributes to visibility
24 degradation, but if a new facility causes a one-deciview
25 change, it causes visibility degradation.

1 So the converse is true, too. If you put controls on a
2 facility and it results in that one-deciview change, those
3 controls will result in perceptible changes in visibility.

4 So this was based on number of years of research study,
5 thinking, looking at psychophysical models.

6 **Q.** And has it been uniformly adopted, the one-deciview
7 change, as the increment of perceivable improvement? Has
8 that been uniformly adopted by Federal Land Managers?

9 **A.** Federal Land Managers. EPA adopted, in 1999, the
10 Regional Haze Rule, and reiterated its position and stance
11 in the 2005 BART rule that a one-deciview change is
12 perceptible.

13 **Q.** And the studies you just described that that's based on,
14 approximately how many participants were involved in those
15 studies?

16 **A.** The three major studies, over 2,000 -- over 2500
17 combined laboratory studies. Probably another hundred. But
18 the major studies were based on the first three surveys done
19 in '79 and 1980 and 2000.

20 **Q.** So thousands of participants?

21 **A.** Yes.

22 **Q.** Can you describe the studies that Dr. Tombach is relying
23 on in his comments about your use of a one-deciview change as
24 an appropriate increment of perceivable improvement in your
25 work for this case?

1 A. Yes. When deciview was first published, I believe, in
2 1994, Pitchford and Malm published a document, in 1994, which
3 first presented deciview in its finalized form.

4 Right after that, there were a number of reviews of
5 that -- Dr. Tombach actually wrote one, too -- discussing was
6 it proper to -- was one deciview truly the perceptible
7 increment.

8 At that point Dr. Ron Henry was funded by the Electric
9 Power Research Institute to do a number of studies of how
10 people perceive visual air quality also. He tried to bring
11 into -- he tried to employ standard techniques used in what
12 we call colorimetry, which is the measure of colors by
13 laboratories, which has been developed over the last 50 years
14 for industrial processes, so that when you manufacture a red
15 cup, all your red cups look the same to people. And there's
16 a very well thought out long process for doing laboratory
17 analysis of color.

18 Well, Dr. Henry developed an instrument called -- a
19 series of instruments called a VICAR, three different ones,
20 for a period of four to five years. It uses a laboratory
21 concept of using an instrument in one eye and viewing a scene
22 with your other eye and trying to generate color matching.

23 His first study was with two people, his final study was
24 with eight people, and he concluded that human perception of
25 colors is confounded by a lot of issues. One of them is the

1 transparency of the atmosphere; the other one is color
2 matching itself, using this particular instrument. And his
3 conclusion was -- final conclusion was that there is a more
4 probability of detection by the public, general public, of a
5 one-deciview change. His final paper resulted in about a 16
6 to 35 percent probability of detection. He considered that
7 to be insignificant.

8 Those studies were also submitted to the EPA in the
9 2005 BART ruling. EPA acknowledged those studies and still
10 said they stood by their position that a one-deciview change
11 is perceptible in Class I areas.

12 Q. And how many participants were involved in Dr. Henry's
13 studies --

14 A. Ten.

15 Q. -- that Dr. Tombach is relying on in this case?

16 A. Total of ten.

17 Q. And who were those people?

18 A. His first one was -- well, himself. Dr. Henry was
19 involved in developing the instrumentation. He had two
20 graduate students in his first one, and he had several other
21 people in the last one. And he tried to pick what we would
22 call naive observers, nine graduate students, to look at his
23 changes, using his instrumentation.

24 Q. So we're talking about the subjects of a study, and the
25 total subjects in the Dr. Henry studies that Dr. Tombach were

1 relying on were approximately 11?

2 A. Ten.

3 Q. And how many subjects were in the studies that the
4 Federal Land Managers have relied on to uniformly adopt the
5 one-deciview increment as the increment for perceivable
6 improvement?

7 A. Over 2,000.

8 Q. You also, Mr. Molenar, recall comments about your work
9 in this case that were contained in Dr. Tombach's report,
10 about the use of pictures --

11 A. Yes.

12 Q. -- to visualize model changes in visual air quality
13 resulting from the reductions in emissions that North
14 Carolina is seeking from TVA in this case.

15 A. Yes.

16 Q. You remember those comments?

17 A. Yes.

18 Q. Did those cause you to change your presentation and your
19 report in any way?

20 A. No.

21 Q. Can you explain to us why that didn't cause you to
22 change your presentation?

23 A. Yes. I'll try to be brief.

24 There is no doubt that a two-dimensional image, a
25 photographic print or a transparency displayed or a movie

1 does not match reality. You do not have the
2 three-dimensional effect there. However, the photographic
3 industry has gone to great lengths to create processes to
4 generate imagery that, while not measured exactly if you were
5 on site, reproduces a response in human beings that is
6 similar to what you see when you're on site.

7 We used transparencies, projected transparencies, and
8 computer images on screens to interpret people's response to
9 visibility. We also tied those to on-site, looking out the
10 window of a three-dimensional scene and found that they were
11 very similar.

12 So the use of photographic prints to show changes in
13 visual air quality, we believe -- I believe, personally --
14 are to be used quite accurately; that we, as human beings,
15 having had the experience of looking at prints, know how to
16 interpret photographic images. It is not exactly what I
17 would see out there, but it is what I would see if I took a
18 picture of it and was reviewing it back at the house. So
19 changes are perceptible similarly.

20 The modeling that we've done has been tested in terms
21 of -- the radiative transfer modeling has been tested in a
22 number of studies which shows that our ability to project
23 colors in the atmosphere are quite good. There has been a
24 few studies done looking at the on-site measurements versus
25 our photographic measurements run through this model. Two

1 major ones. One was in a Dallas/Fort Worth -- a study in
2 Dallas/Fort Worth looking at brown clouds there due to what
3 they thought were caused by power plants, looking at
4 perceptible changes. It's in the report which Dr. Tombach
5 was editor of and principal investigator of.

6 In that particular case, I created images of
7 Dallas/Forth Worth that Dr. Ron Henry made measurements from,
8 and the results between on-site measurements and the imagery
9 was done quite well, and in that report they state that
10 photographic imagery, while having limitations, is still the
11 best way of doing it.

12 There was a second study done by Ron Henry, images of
13 Grand Canyon for the Project Mohave. Those results were not
14 as good, and Dr. Henry and I had a lot of communication about
15 those results, about why they weren't as good. The results
16 of that particular study was just done by Dr. Henry looking
17 at the images. And that's in a report that's been sent to
18 Project Mohave. It's a report that's not widely available.
19 I've got a copy of it and a few other people have.

20 But, in general, my experience is, after all these years
21 of doing this, is that people can accurately judge changes in
22 imagery as well as they can in the real world.

23 Q. Okay. SAMI used pictures and photographs?

24 A. Yes. SAMI report has images, actually, of the Great
25 Smoky Mountains in their executive summary. VISTAS is using

1 it currently. They have used WinHaze to generate, again, the
2 current conditions and their projected improvements in 2018.
3 Those images are available on the VISTAS website to the
4 public, and it's used -- it's been used in perception
5 studies. It's been used in cost-benefit analysis studies by
6 the National Park Service, EPA. Electric Power Research
7 Institute has used the computer imagery to generate images to
8 look at perception work, cost-benefit work, to look at
9 projected improvements in the future from the Regional Haze
10 Rule. It's used on people's desktops just to play games with
11 it and see what would happen with it.

12 Q. And Dr. Anne Smith, who is an economist who we're going
13 to hear some testimony from, apparently, on behalf of TVA,
14 has she used this approach in some of her work?

15 A. Yes. Dr. Smith, a few years ago, examined a
16 cost-benefit analysis, a willingness-to-pay analysis, for
17 what people would pay for changes in visibility. It was
18 originally done by National Park Service in the early '90s
19 with real 35-millimeter slides.

20 The problem with real 35 millimeter slides is you can't
21 control accurately the changes. You can only show whatever
22 you took pictures of. I created a series of slides of
23 Shenandoah National Park using WinHaze, that she used in her
24 analysis of people's willingness to pay for changes in
25 visibility.

1 Also done this for, again, SO2 reductions in Cincinnati.
2 It was used by the State of Arizona to set their visibility
3 standards in Phoenix, Arizona, created imagery of the city
4 under various air quality levels, and then they surveyed the
5 public and said at what level is visibility unacceptable, and
6 they set their visibility standard based on that survey.

7 **Q.** What about the use of split images, as you showed us in
8 your testimony? Is that a generally-accepted approach?

9 **A.** It's been used by a lot of people. There are arguments
10 about split imagery. Split imagery -- the eye-brain system
11 we've developed we look at edges. See edges really well.
12 There's lots of reasons for that. One, you want to step off
13 a cliff, you want to see edges. When you split an image,
14 you're not changing the stimulus on the two images; you're
15 just putting them side by side with that long, straight line
16 and so you see the line better, but the two stimuli on either
17 side are not changing. It does not modify the stimulus; it
18 allows the change in the stimulus to be seen a little easier.

19 In fact, WinHaze, when you split an image, brings up a
20 warning saying, if you split the image under very low levels
21 of change, you can enhance the perception of that change. On
22 a large level of change, it has very little effect at all.

23 **Q.** Is that a factor in this case?

24 **A.** The images I show, those were enlarged changes. They
25 had no effect.

1 Q. And does the Park Service use split images to show
2 visual air quality changes?

3 A. Yes. The Park Service uses split images; EPA uses split
4 images; regional planning organizations have used split
5 images. The EPA, the cover image on their 1996 National Air
6 Quality Report is a split image of the Great Smoky Mountains.
7 Actually, it's the same image as in the exhibits here.

8 Q. So the use of pictures, split images and WinHaze to
9 model changes in visual air quality resulting from additional
10 air pollution controls, this was used in SAMI?

11 A. Yes.

12 Q. And it was used in VISTAS?

13 A. Yes.

14 Q. And TVA's involved with VISTAS as well as SAMI?

15 A. Yes.

16 Q. And has Dr. Tombach himself used these kinds of
17 photographic representation techniques to show air quality
18 changes?

19 A. I believe he has. He has a copy of WinHaze. He is --
20 I've discussed it with him, his use of it. I've never
21 actually been at a presentation where he's used it. I have
22 to say that.

23 Q. And just for clarification, the base photographs that
24 you used in your simulations, those are not natural
25 background; is that right?

1 A. The base photographs in --

2 Q. That you used in your study in this case.

3 A. Yes. Yes, that's not natural ground.

4 Q. That is not natural background.

5 Can you explain the difference for us, please?

6 A. Yeah. The base images here are typically somewhere
7 around 15 to 20-mile visual range. What would be considered
8 natural background on the east is a visibility of about 110
9 to 115-mile visible range, much cleaner than the base we use
10 here.

11 Q. So the first photographs that we saw in each of your
12 series, those are not natural background photos?

13 A. No. Those are -- what STI did was model every day in
14 2002. Every day but one, actually. Missed December 31st.
15 They modeled what would be under the current emissions
16 scenarios. And so they modeled every day, and then they
17 removed the emissions from TVA with additional controls and
18 then remodeled the day, and modeled the change on an
19 every-day period, and so that maximum changes occurred on the
20 haziest days, not on natural background days.

21 MR. GOODSTEIN: Can I have a moment, Your Honor? I
22 think we can pass the witness. I just want to check with my
23 co-counsel for a minute.

24 THE COURT: All right.

25 (Pause in the proceedings.)

1 BY MR. GOODSTEIN:

2 Q. Mr. Molenaar, if that analysis that you presented was --
3 if you looked at the scenario with controls and compared that
4 to natural background, how would that -- how would that
5 affect the change that is shown?

6 A. If you were to --

7 Q. Would it be a larger change or a smaller change?

8 A. It would be larger and more frequent. If you took the
9 model, decreasing in extinction for every day of 2002
10 projected by Sonoma Technology, instead of comparing it to
11 the visibility on that day, compared it to what we call
12 natural background, which is what the Regional Haze Rule
13 says, instead of 40-plus days per year of one-deciview
14 change, you'd have over 100-plus days per year of
15 one-deciview change, with the maximum changes being over 20
16 deciviews.

17 Q. But what your analysis did was look at a base case
18 projected by Sonoma Technology --

19 A. Right.

20 Q. -- and compared that to the case with additional
21 controls, consistent with what is sought by North Carolina on
22 TVA plants, and then you showed us the difference --

23 A. Yes.

24 Q. -- between those two?

25 A. Yes.

1 **MR. GOODSTEIN:** No further questions at this time,
2 Your Honor.

3 **THE COURT:** All right. We will take our noon
4 recess, and ask you to be back with us at 2:15.

5 **(Recess.)**

6 * * * * *

7 **[END OF VOLUME 6A]**

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11
12 UNITED STATES DISTRICT COURT
13 WESTERN DISTRICT OF NORTH CAROLINA
14 CERTIFICATE OF REPORTER

15
16 I certify that the foregoing transcript is a
17 true and correct transcript from the record of proceedings
18 in the above-entitled matter.

19 Dated this 22nd day of July, 2008.

20
21 S/ Karen H. Miller

22 _____
23 Karen H. Miller, RMR-CRR
24 Official Court Reporter
25